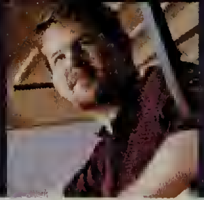
IMPROVEMENT PLAN

New CTO John Roese says Nortel can compete with Cisco — if it makes some changes. **PAGE 10**



ACING THE INTERVIEW

David Christiansen offers six questions to ask before accepting an IT job offer. **PAGE 36**

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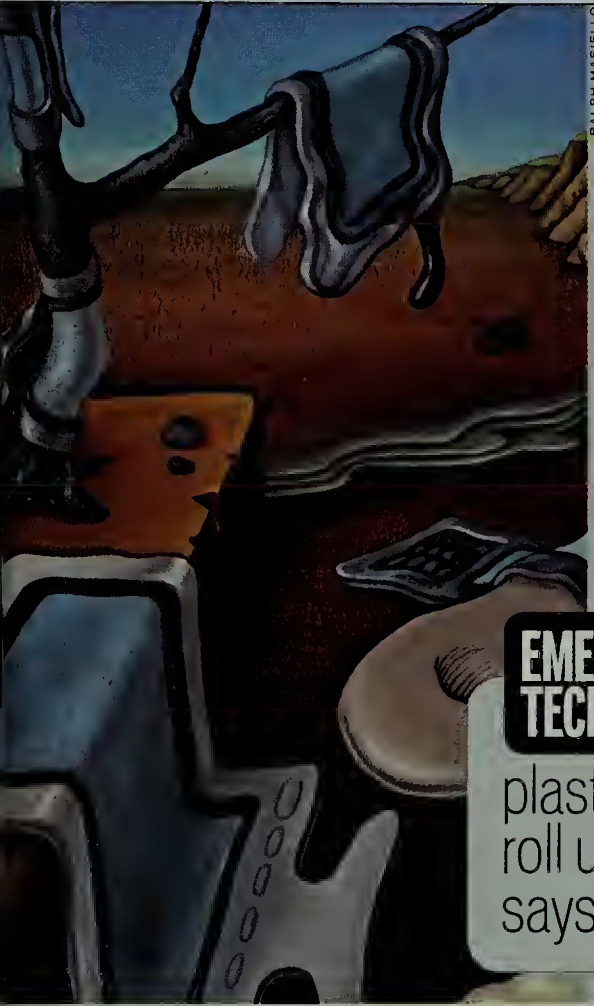

RALPH MASIELLO

new twist on displays

EMERGING TECHNOLOGIES Get ready for thin plastic screens that can bend, roll up or wrap around your wrist, says Robert L. Mitchell. **PAGE 23**

VA Pushed To Pursue IT Overhaul

Stolen laptop is recovered, but agency is planning reorg to help boost security

BY JAIKUMAR VIJAYAN

The FBI last week recovered the stolen laptop and external disk drive containing personal information on some 26.5 million veterans and active-duty military personnel. But the return of the equipment did little to stanch the calls for a sweeping restructuring of the IT operations at the U.S. Department of Veterans Affairs, partly to help prevent more data breaches.

The organizational problems were highlighted by the disclosure of two additional breaches that potentially compromised the personal information of more than 16,500 veterans — one involving a backup tape that was determined to be missing from a VA facility in early May, the other stemming from the loss of papers when an employee's rental car was stolen last year.

GETTY IMAGES

NICHOLSON: Breach was a "wake-up call to make changes."

At a hearing held last Thursday by the House Committee on Veterans' Affairs, VA Secretary R. James Nicholson said the agency has signed on IBM to help implement a planned IT reorganization that was approved last fall in an effort to cut internal costs and improve

VA, page 41

U.S. Puts Money on Ultrafast Supercomputers

Awards contracts for systems with petascale performance

BY PATRICK THIBODEAU

The U.S. government is planning to spend hundreds of millions of dollars over the next several years to fund the development of huge supercomputers with power beyond anything available today. The goal is to address the most challenging problems facing science, national security and industry.

Several government agencies have awarded or are about to award contracts for systems capable of sustained petascale computing speeds, which can handle quadrillions of calculations per second. To understand the scale of these planned systems, only one system on the Top500 supercomputer list released last week surpassed 100 TFLOPS.

Earlier this month, Seattle-based Cray Inc. signed a $200 million contract to deliver a petascale-capable system to the U.S. Department of Energy's Oak Ridge National Laboratory by 2008. That system, based on processors from Advanced Micro Devices Inc., will be built in phases of ever-increasing speeds.

The National Science Foundation in June began seeking proposals for a larger high-performance supercomputer

Ultrafast, page 12

EMC Expands Into IT Security

Storage vendor to buy RSA for $2.1B

BY TODD R. WEISS, JAIKUMAR VIJAYAN AND SHARON FISHER

In a deal that marries one of the world's biggest data storage vendors and one of the IT industry's best-known security companies, EMC Corp. last week agreed to acquire RSA Security Inc. for $2.1 billion in cash.

"The mandate is clear from our customers: We need to be able to ensure that the information is secure and encrypted," said Joe Tucci, EMC's chairman, president and CEO.

"The notion of protecting the security of data as well as the integrity means the marriage of RSA and EMC makes sense," said John Halamka, CIO at

EMC/RSA, page 12

INSIDE

QuickStudy: Data backups aren't a one-size-fits-all kind of thing. Page 29

NEWSPAPER

[1]IBM System p5 and eServer p5 servers hold the number one position in over 70 benchmarks. For details, visit ibm.com/systems/p/benchmarks. [2]Based on IBM TPC-C result of 1,025,169 tpmC at $4.42/tpmC on a 16-core (8 processors, 32 threads) 2.2 GHz IBM System p5 570 (configuration planned to be available 5/31/06) compared to HP TPC-C result of 332,265 tpmC at $4.48/tpmC on a 16-core (16 processors, 16 threads) 1.6 GHz rx8620 running Windows® Server 2003 Datacenter Edition (configuration available 7/15/05). For details, visit www.tpc.org. IBM, the IBM logo, System p5 and Take Back Control are trademarks or registered trademarks of International Business Machines Corporation in the United States and/or other countries. UNIX is a registered trademark of The Open Group in the United States and other countries. Other company, product and service names may be trademarks or service marks of others. © 2006 IBM Corporation. All rights reserved.

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_As for the old servers, well...they kept crashing. Into the ground.

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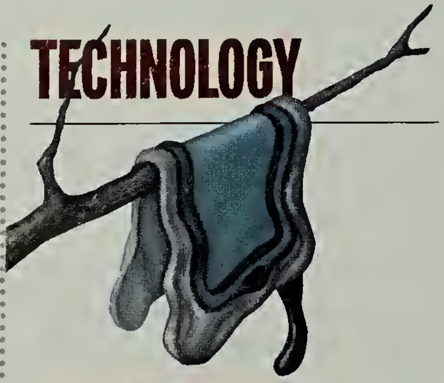

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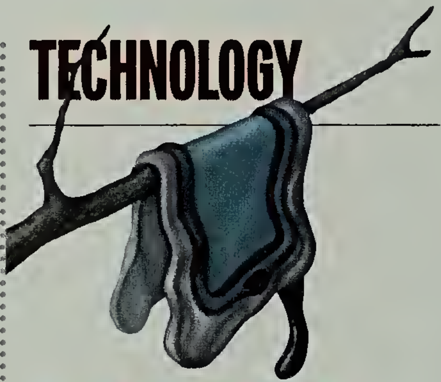

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AT DEADLINE

Microsoft Further Delays Office 2007

Office 2007 is now likely to ship a few months later than previously expected. Microsoft Corp. said the delay is to help engineers better incorporate feedback from the 2.5 million Office 2007 beta testers. The software will now ship to business users by the end of this year, about two months later than the previous ship date.

Red Hat Hit With FireStar Patent Suit

FireStar Software Inc. has filed a patent infringement lawsuit against Red Hat Inc., alleging that Red Hat's Hibernate 3.0 software infringes on a patent issued in August 2000. Hibernate 3.0, a persistence engine, is a component of the JBoss Enterprise Middleware System. Red Hat gained the software with its acquisition of JBoss Inc. last month. FireStar is seeking unspecified damages. A Red Hat spokesman declined to comment.

CA Again Postpones Filing 2006 Results

CA Inc. for the second time has delayed filing its fourth-quarter and full-year 2006 results. The decision was made after the company uncovered problems concerning the granting of employee stock options and the understating of subscription revenue during its annual audit. CA was originally due to release its financials at the end of May. Officials said they could not yet determine a new filing date but said that they hope to complete the work by the end of this month.

Bank Hires EDS to Merge Networks

Bank of America Corp. has hired Electronic Data Systems Corp. to merge the communications network of recently acquired MBNA Corp. into its own voice and data network. EDS is already running Bank of America's nationwide network as part of a 10-year, $4.5 billion deal that was signed in February 2003.

Unisys Confirms Shift On Mainframe CPUs

ClearPath systems will transition to Intel processors

BY PATRICK THIBODEAU

UNISYS CORP. last week said it plans to phase out the CMOS processors used in its ClearPath mainframes and enable its MCP and OS 2200 operating systems to run on Intel-based hardware.

The company first broached the possibility that it would leave the CMOS technology behind last fall, after agreeing to collaborate with NEC Corp. on the development of high-end servers built around Intel Corp.'s Xeon processors. Even though Unisys has now established a definite plan, it will move gingerly on the transition because the change is a major one for users.

Unisys said it will release its first Xeon-based ClearPath hardware in late 2007, with support for Linux and Windows in addition to MCP and OS 2200. But the vendor isn't setting an end-of-life date for the internally developed CMOS processors or ruling out future upgrades.

"We continue to reserve our options," said Colin Lacey, vice president and general manager of the company's enterprise server business unit.

Lacey added, though, that the expected performance growth of Intel's multicore Xeon chips leaves "no specific reason to carry forward on a unique processor" design.

"This is a drastic change for the 2200 and MCP customers," said Greg Schweizer, a systems administrator and ClearPath user at Oregonian Publishing Co. in Portland, Ore. "But knowing the quality control that Unisys has always had in testing, I wouldn't expect them to release [the Intel-based hardware] until they are confident that it is bug-free."

Kevin Kelly, who does software support on systems running OS 2200 at the Virginia Information Technologies Agency in Richmond, said he has questions about the reliability, cost and processing power of the upcoming Intel-based machines. "I don't know what it means in terms of performance," Kelly said.

User Support

But Marian Ritland, development and operations manager at the University of Wisconsin-Eau Claire, said she supports the Unisys plan. The school runs its core academic applications on a ClearPath system with MCP. Unisys' adoption of Xeon gives Ritland "good, solid reasons why continuing with [the MCP] environment makes business sense," she said. "It makes it a little easier to convince upper management that Unisys is a viable long-term strategy and not something to be migrated off of."

Ritland, who also is chairwoman of the Unite Inc. user group in St. Clair Shores, Minn., said that many MCP users run custom-built applications and don't want to leave that operating system behind because of its reliability and security. She added that the move to Intel CPUs will make it easier for Windows and MCP applications to work together in shared environments, which Ritland sees as a plus.

Unisys, which already uses Intel processors on some of its low-end and midrange ClearPath systems that run MCP, will continue to develop the two mainframe operating systems. Firmware will sit between the Xeon processors and the operating systems, allowing users to run their applications on the Intel-based hardware without any alterations, according to Lacey.

He said that users will be able to easily move their applications to the new hardware. "This is a plug-and-play solution, from a customer perspective," Lacey said. ▸

White House Sets Security Agenda for Federal Agencies

BY JAIKUMAR VIJAYAN

The White House Office of Management and Budget has given government agencies 45 days to ensure that they have a prescribed set of security controls in place for protecting sensitive data when it is accessed from remote locations or stored on laptop PCs and other mobile devices.

In a memorandum dated June 23, Clay Johnson III, the OMB's deputy director for management, directed agency heads to implement a checklist of data protection measures from the National Institute of Standards and Technology.

The actions suggested by NIST include identifying and categorizing information that needs to be protected, and verifying the adequacy of existing protections. NIST also recommends that personal information be encrypted when it is transported to or stored in remote locations.

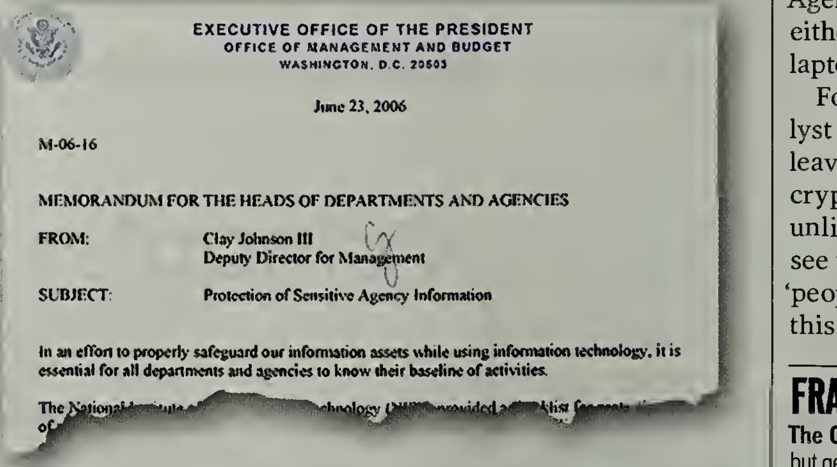
In addition to calling on agencies to adopt NIST's recommendations, Johnson identified four other measures that they should have in place. His list includes encrypting sensitive data on all mobile computers, using two-factor authentication and a time-out function for remote access to systems, logging all computer-readable extracts from databases containing sensitive information, and verifying that they are erased within 90 days unless users still need them.

John Pescatore, an analyst at Gartner Inc., said the requirements are pretty basic, but it's "good to see the OMB do this."

He added, though, that commercial encryption software can cost $50 to $100 per laptop and that open-source alternatives don't have very good management capabilities.

Pescatore said most agencies are likely to say that they don't have the funds to meet the encryption requirement or can't do so within 45 days. Agencies may "be forced to either get waivers or not allow laptops to be used," he said.

Forrester Research Inc. analyst Jonathan Penn said that leaving it to end users to encrypt data on their laptops is unlikely to be very effective. "I see too many dependencies on 'people doing things right' for this to work reliably," he said. ▸



EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

June 23, 2006

M-06-16

MEMORANDUM FOR THE HEADS OF DEPARTMENTS AND AGENCIES

FROM: Clay Johnson III
Deputy Director for Management

SUBJECT: Protection of Sensitive Agency Information

In an effort to properly safeguard our information assets while using information technology, it is essential for all departments and agencies to know their baseline of activities.

The OMB wants agencies to adopt a common "baseline" on security.

FRANKLY SPEAKING

The OMB's requirements are a good start, but getting users to act securely is a big challenge, says Frank Hayes. **Page 42**

Microsoft Issues Road Map for Unifying Communications Tools

Product bundling plan is expected to drive competition with VoIP vendors

BY TODD R. WEISS AND MATT HAMBLEN

Microsoft Corp. last week laid out a communications product road map that includes plans to ship unified voice, video and messaging capabilities by mid-2007.

Jeff Raikes, president of the company's business division, said the plan calls for bundling functions and creating a single user identity across multiple communications modes.

Microsoft's strategy will likely lead it into stiff competition with voice-over IP (VoIP) vendors such as Cisco Systems Inc. and Avaya Inc., according to analysts. Already, the software vendor's planned approach is attracting the attention of IT executives such as Bob Schwartz, CIO at Panasonic Corporation of North America in Secaucus, N.J.

"I think we're all looking at it," Schwartz said. He added that he is particularly interested in how Microsoft and its rivals can link communications systems such as instant messaging, wireless data or voice tools, and e-mail. Such integration is now mostly done in-house by corporate IT departments, he said.

"We're trying to take a more holistic view of that environment," Schwartz said, noting that he prefers buying bundled packages instead of using discrete, individual components to create workplace communications systems.

Initiative 'Holds Promise'

Raikes said that several products will ship during the second quarter of 2007, including Office Communications Server 2007, which will replace Microsoft's existing Live Communications Server software. The new package will include VoIP call management capabilities and be able to provide IM communication and audio-, video- and webconferencing across multivendor software applications and devices.

Jim Prevo, CIO at Green Mountain Coffee Roasters Inc. in Waterbury, Vt., said Microsoft's "whole 'knowledge worker' initiative holds promise for improving the way office-based workers interact and collaborate. We are looking at their offerings and will make some investments in the coming year." At the same time, Prevo said his company is "formulating our strategy for future years in this area."

Green Mountain is not yet a major collaboration software user, Prevo said. "We are very early on the curve," he said. "We often use e-mail as if it was IM. We see a need to take this all up a notch and provide better tools to our users to make them more efficient and effective."

Prevo did say he is concerned that Microsoft's offerings may overlap with Cisco's products. "I need these two vendors to collaborate more than compete," he said.

NEW PRODUCTS

Microsoft's Unified Communications Lineup

- **Office Communications Server 2007:** Will support real-time communications in various modes.
- **Exchange Server 2007:** Will provide a unified messaging in-box.
- **Office Communicator 2007:** Client software will work with Communications Server 2007.
- **Office Live Meeting:** Conferencing software will have improved audio and video capabilities.
- **Office RoundTable:** Will be an audio-video collaboration device.

Meanwhile, Microsoft said its communications strategy includes partnership agreements with several firms, including Polycom Inc., LG-Nortel Co., Thomson Telecom, Hewlett-Packard Co., Siemens AG and Motorola Inc.

Zeus Kerravala, an analyst at Yankee Group Research Inc. in Boston, said questions remain about whether the unified communications products will be ready for corporate use when they first ship next year.

"Buyer beware," Kerravala warned. "When has Microsoft ever entered a market with a business-ready product out the door? They eventually get it right, but the first versions are usually not corporate-ready."

At the same time, Kerravala said, the product road map shows that Microsoft has become "a huge threat to all the VoIP competitors." In several years, he said, Microsoft, Avaya and Cisco could together hold about 90% of the VoIP market.

Ken Dulaney, an analyst at Gartner Inc., predicted that Microsoft's strategy will be fulfilled in five to seven years, which could be a good timetable for corporate users. "IT managers are much more into evolution than revolution these days," Dulaney said, "so this announcement fundamentally makes some sense." ▸

Concerns About Fraud Potential Continue to Plague Users of Electronic Voting Machines

Report says flaws must be fixed for upcoming votes

BY MARC L. SONGINI

Electronic voting machines will be vulnerable to fraud this election season unless countermeasures are taken, according to a report issued last week by the New York University School of Law.

E-voting devices, such as touch-screen or optical scan systems, are becoming more prevalent nationwide, and most of them are vulnerable to external attack, according to the report compiled by the school's Brennan Center for Justice.

The report was prepared over an 18-month period by computer scientists and voting machine experts working on a task force set up by the Brennan Center to examine voting system security.

Larry Norden, chairman of the task force and an attorney at the Brennan Center, said that over the past several years, half of all manual voting systems in the U.S. have been replaced with electronic devices. Elections officials cite the need to meet the requirements of various federal laws and the need for improved accuracy in installing the systems.

However, Norden said, "we've not necessarily adapted our [security] procedures to that new technology."

The report cites some 120 potential threats to e-voting systems and notes that most states have no system in place to detect malicious software attacks.

Ion Sancho, elections supervisor for Leon County, Fla., and a critic of e-voting system security, said the report confirms his worst fears about electronic voting.

Recommendations

From Brennan report on e-voting gear flaws:

- **Randomly audit electronic voting machines.**
- **Disable wireless capabilities.**
- **Test machines in parallel.**
- **Implement safety procedures such as the impounding of machines showing faulty results.**

On the other hand, Michael Shamos, a professor who specializes in e-voting issues at Carnegie Mellon University in Pittsburgh, questioned the report's conclusions.

"The fundamental premise of the Brennan report and many activists is that it's easy to rig a machine to throw an election," said Shamos. "It isn't.

"You have to install Trojan horse software that not only swaps votes but does so in a way that won't immediately be obvious from the demographics of the precinct and evades all tests to detect it before and after the election," he said. "No one knows how to do that."

Omaha-based voting device maker Election Systems & Software Inc. last week said it is reviewing the report and couldn't address its specific conclusions.

The report did not go unnoticed in Washington. "This nonpartisan report . . . confirms what many of us have believed for years: Electronic machines are all vulnerable to error or manipulation that could change the outcome of elections," said Rep. Rush Holt (D-N.J.), who has proposed federal legislation to tighten the security of electronic voting machines.

"We ignore this at our peril," Holt said.

To compensate for the flaws, the report urges elections officials to take a number of steps. They include removing wireless components, conducting random audits of paper records and decentralizing the voting systems' administration and programming.

Norden said there was time to implement these safeguards before November's elections, and copies of the report are being distributed to every secretary of state in the country. ▸

BRIEFS

Two Issues Restrain Open-source Java

A Sun Microsystems Inc. executive said the company must resolve two key issues before releasing Java to the open-source world. Simon Phipps, Sun's chief open-source officer, said it must decide how to keep Java compatible and find a way to ensure that a single company doesn't create its own implementation, which would threaten Java's "write once, run anywhere" mantra.

IBM Accelerates Linux Cluster

In a move to get ahead of rival Hewlett-Packard Co. in the high-performance computing business, IBM has signed an agreement with ClearSpeed Technology Inc. to offer the ClearSpeed Advance accelerator board as a supplement to its Linux-based System Cluster 1350. IBM hopes the accelerator will help improve sales to the finance, oil and gas exploration, and life sciences industries.

Intel Ships First Dual-Core Xeon Chip

Intel Corp. last week released its dual-core Xeon processor, code-named Woodcrest, the first based on its new Core microarchitecture. The Xeon 5100 chip uses 40% less power than its predecessors while improving performance by a factor of three, said Intel Senior Vice President Pat Gelsinger. Some 150 companies will offer more than 200 Xeon 5100 systems, Intel said.

Grid Industry Groups Complete Merger

Two grid computing groups – the Global Grid Forum and the Enterprise Grid Alliance – last week fulfilled a February promise to merge. The new Open Grid Forum aims to speed the adoption of grid technology worldwide. The forum said it plans to work with other standards bodies, including the World Wide Web Consortium and the Storage Networking Industry Association.

ON THE MARK

HOT TECHNOLOGY TRENDS, NEW PRODUCT NEWS AND INDUSTRY BUZZ **BY MARK HALL**

DAVE CLARK

Eclipse Blots Out the Future . . .

. . . for other Java integrated development environments (IDE). In a poll of software developers last December, Huntington, N.Y.-based BZ Research found that 65% of the 621 respondents were using the open-source Eclipse IDE for coding in Java. Among the 22 other Java IDEs mentioned in the survey, the next closest garnered a 20% usage share among the surveyed developers. With those results in mind, John Michelsen, chief architect at iTKO Inc. in Dallas, says his company will turn its Lisa 3.0 software testing tool into an Eclipse plug-in by year's end. Michelsen says that Eclipse has suddenly become so dominant among Java programmers that "the question is no longer whether we will support Eclipse, but whether we can support non-Eclipse use of Lisa."

MICHELSEN: Eclipse is showing its dominance.

Ward Cunningham, a community development director at Eclipse Foundation Inc. in Ottawa, is happy but cautious about the Eclipse technology's ascendancy from zero market share in the first of BZ Research's annual surveys in 2002 to top of the pack last year. "Winning in the marketplace means surviving your success," he says. "We have to make sure it's a wise decision for developers to continue to support Eclipse." For the first time, the annual update of Eclipse, code-named Callisto and due this month, will be released simultaneously with 10 popular open-source plug-ins, including a business intelligence and reporting tool and a visual editor. In addition to being open-source, Eclipse is language-agnostic, Cunningham notes. You can use Java, of course, but you can also develop in C, C++, Python and others. What about .Net? Not yet, but, "it's possible" in the future, Cunningham suggests.

Matrix 12 is complete, but don't look . . .

. . . for Keanu Reeves. The IT Compliance Institute (ITCI) in Seattle has unveiled its twelfth compliance matrix for IT pros who want an overview of a regulatory topic as well as the ability to drill down into the specifics of a given regulation to see how its provisions affect IT processes.

According to Cass Brewer, the institute's editorial and research director, the latest matrix on privacy rounds out the ITCI's Unified Compliance Project, a free online service that also covers areas such as risk management, security and audits. Brewer says the biggest problem for IT managers in complying with government mandates is duplication of efforts. IT "has been building redundant, incompatible processes and technology" to meet compliance demands, when one project often can cover multiple requirements, she says.

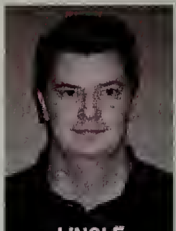
For example, Brewer points out that controls demanded by credit card companies often satisfy individual states' privacy laws. She says more companies are creating the role of chief compliance officer to help manage compliance projects and minimize duplicate work. The ITCI celebrates the one-year anniversary of its matrices this month.

Regulation approved in 1988 springs . . .

. . . to life 19 years later. Next year, the U.S. Food and Drug Administration will begin enforcing provisions of the Prescription Drug Marketing Act of 1988 that require companies to prove the pedigree of pharmacist-dispensed drugs. Now pharmaceutical makers and distributors will need to document the path that a drug took from the assembly line to a pharmacy's shelves.

Piers Lingle, chief technology officer at Scottsdale, Ariz.-based Axway Inc., claims that his company's Synchrony Healthcare Compliance Suite is based on the ePedigree industry standard and helps companies track the journeys of drugs to their final destinations. The tool will be available this month; pricing is implementation-specific.

0.05% Percentage of revenue that compliance costs large companies, says CRA International.



LINGLE says his software tracks where drugs go.

Tune in to your lost laptop and . . .

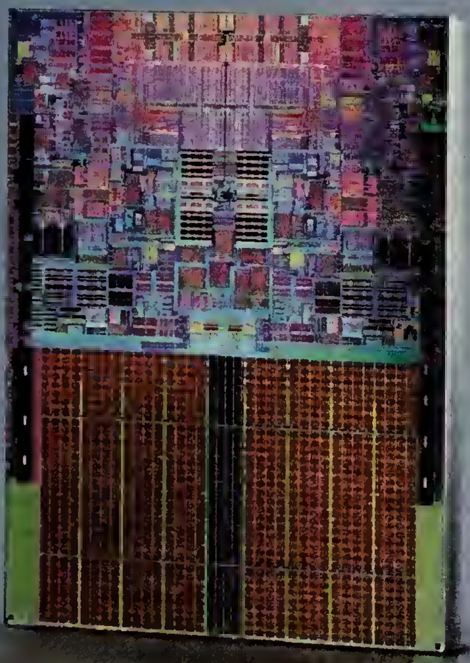
. . . locate it via TV signals. John Metzler, director of business development at Rosum Corp. in Mountain View, Calif., suggests that as laptop vendors begin to add television tuners to their wares sometime in 2008, CIOs might want to give the devices a closer look. No, not so road warriors can keep abreast of plot twists in *General Hospital*, but because of the potential added security that the tuners can bring.

According to Metzler, Rosum has developed its TV-GPS tracking technology to home in on a device's location by triangulating broadcast signals from TV station antennas. The key advantage of TV-GPS, he claims, is that it can track signals inside buildings and in dense urban areas, where most GPS systems perform poorly.

Metzler says that in two months, Rosum will begin shipping credit-card-size modules that manufacturers of first-responder electronic gear can integrate into their portable devices so emergency crew members can be located no matter where they go. In time, he says, TV-GPS will be able to fit on a laptop's TV tuner and be used to locate lost computers. Finally, television worth tuning in to. ▸

554m Height of Toronto's CN Tower for broadcast TV.

intel
Leap ahead



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Johan De Gelas, AnandTech

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*Performance measured using SPECint*_rate_base2000 and SPECint*_rate_base2000/SysWatt, comparing a Dual-Core Intel® Xeon® processor 5160-based platform to an [illegible] Performance also measured by other leading performance benchmarks and compared to leading published competitive results. Actual performance may vary. See http:// [illegible] for [illegible] ©2006 Intel Corporation. Intel, the Intel logo, Xeon, Xeon Inside, Intel. Leap ahead., and the Intel. Leap ahead. [illegible] are trademarks or registered trademarks of Intel Corporation or [illegible] countries. All rights reserved.

BRIEFS

Xerox, Palm Agree to $22.5M Settlement

After nine years of court battles, Palm Inc. has agreed to pay $22.5 million to Xerox Corp. to settle a dispute over technology for writing notes on the touch screen of a PDA. Xerox filed a lawsuit against Palm in 1997, claiming that the handwriting-recognition technology that Palm called Graffiti infringed a Xerox technology known as Unistrokes. The settlement lets Palm continue to use the technology.

Intel Sells Business Unit for $600M

Intel Corp. plans to sell its communications and application processor unit to Marvell Technology Group Ltd. for $600 million. The sale is part of an effort by Intel to shore up its core businesses in the face of a slowing global PC market and increasing competition from Advanced Micro Devices Inc. In April, Intel disclosed plans to cut costs in the wake of declining revenue.

Linux Sales Boost Red Hat Q1 Revenue

Red Hat Inc. credited strong Linux sales for a 38% increase in revenue during its first quarter, which ended May 31. The company said that Linux subscription revenue grew 48% to $71.5 million, during the quarter.

RED HAT BY THE NUMBERS

	REVENUE	[illegible]
Q1 '07	$84M	$13.8M
Q1 '06	$60.8M	$12.4M

Tips Ready for Mobile Web Development

The World Wide Web Consortium has released a list of best practices for developing Web pages that can be displayed on small mobile devices. The recommendations were compiled by a team of experts from Nokia Corp., Google Inc., Microsoft Corp., AT&T Inc., Vodafone Group PLC, France Telecom SA and other firms. The group is now seeking feedback from developers.

New Nortel CTO Targets Cisco's Network Control

But Roese says vendor needs to better coordinate R&D, improve marketing

BY MATT HAMBLEN

LAST WEDNESDAY, **John Roese** officially became chief technology officer at Nortel Networks Corp., which announced his hiring the previous week. Before joining Brampton, Ontario-based Nortel, the 35-year-old Roese (pronounced "rose") was CTO at Broadcom Corp. for three months, and he previously held the same title at Enterasys Networks Inc. and Cabletron Systems Inc. He spoke with *Computerworld* last week about what Nortel needs to do better in order to become a stronger rival to Cisco Systems Inc. Excerpts from the interview follow:

Q&A

What do you bring to Nortel? A technology company without a dedicated focal point for the technology community is at risk of drifting. It's extremely important that there be a CTO at a company like this to keep people on target and provide a litmus test as to whether you are moving in the right direction. When I was CTO of Cabletron, I was a Nortel partner early on, and then a competitor when Nortel bought Bay Networks. I understand the enterprise and the metropolitan-area network spaces.

You left Broadcom after a short stint there. What changed? I was fairly happy at Broadcom. First, I said no to Nortel, and then, with more visibility, I saw that Nortel was a $10 billion enterprise, with 12,000 R&D folks and a [corporate] brand that was still in pretty good shape. There was a technology basis and engineering expertise here. Nortel is doing great things, and nobody seems to know that.

What are the biggest things Nortel needs to improve upon? Well, two things: One, we have to behave like the company we are — like a broad company that builds communication systems. Each silo of products is a part, but you can't just build a product in a cell and hope it works in the enterprise.

Two, we have to tell our story. CTOs are mostly about technology and partly about marketing. The reality is that when I went out to talk to companies, I got a good response from Nortel customers, [but] when I stepped outside of Nortel customers, people didn't know how big Nortel was. Customers want choice. They need to have an alternative to the Cisco marketing machine that tells people they have no other options. We have to communicate that.

What will the company's leading technology area be in, say, five years? It's tough to predict five years in the future. But I'm going to spend a lot of my time to make sure it happens that we lead in the enterprise infrastructure business. The enterprise market is desperately looking for an alternative to Cisco. They really want someone to step up with scale, brand and technology solutions. And when I look around, the only candidate is Nortel.

Nortel may be one-half [of] the $12 billion in enterprise revenue that Cisco is, but what I believe from talking to enterprise customers is that if anyone starts to behave like an alternative to Cisco, there will be a relative shift because the market is out of balance.

But what do you say to the IT manager I talked to recently who has thousands of users on Avaya phones and is looking at alternative vendors? He said he wouldn't touch Nortel because of the taint from your financial restatements. Well, shame on us for not engaging him appropriately. I wonder if he has the right information about our company. If the first time a person hears from a salesperson, that customer's only experience is a negative public impression, it's tough to sell him.

The doors inside the Nortel installed base are definitely open [to us]. How we will generate growth is from competitive displacement. [But] to get pull in the market won't necessarily come from the creation of new products. It's from shifting Nortel from an inward focus toward creating noise about the good things going on. The negative press about financial restatements or executive replacements are countered by talking about who uses Nortel [equipment and services]. That has not been done. ▸

> Customers want choice. They need to have an alternative to the Cisco marketing machine. . . . We have to communicate that.
>
> **JOHN ROESE**, CTO, NORTEL NETWORKS CORP.

Nortel to Cut Jobs, Consolidate Support Centers

NORTEL NETWORKS last week announced restructuring plans that will result in a net reduction of about 1,100 jobs by 2008, partly through the consolidation of the company's worldwide support and order management operations into a group of regional offices.

The latest changes, which also include modifications to Nortel's pension plan for employees in the U.S. and Canada, are part of an ongoing corporate makeover that's designed to improve the company's financial performance. Overall, Nortel hopes to increase its operating margins by more than $1.5 billion by 2008.

The networking vendor said it will cut 1,900 existing jobs – 1,200 as part of the consolidation of more than 100 offices into the new regional operations centers, plus another 700 through a combination of middle-management layoffs and "business unit efficiencies."

However, the cutbacks will be partially offset by the planned creation of 800 positions at the regional operations centers, according to Nortel. The centers will provide engineering, product and technical support to customers and handle functions such as order management, purchasing and data analysis.

The company said two of the planned facilities will be set up in Mexico and Turkey, which were chosen in order to take advantage of Nortel's existing operations in those countries as well as their "strong labor pool, cost competitiveness and proximity to major customers."

Nortel currently has about 35,000 employees, an amount that will be reduced by 3% as a result of the cutbacks.

Rob Whiteley, an analyst at Forrester Research Inc., said the actions announced last week show that Nortel "has a laser commitment to improving its bottom line."

In addition, CEO Mike Zafirovski, who was hired to run the company last fall, is focusing Nortel on technology areas where it can hold at least a strong No. 2 position in market share, Whiteley noted. "It's a good company with good products – just bad marketing and execution," he said, adding that he doesn't think this will be the last restructuring by Novell.

– MATT HAMBLEN

SGI Adds x86 Servers to Low-End Offerings

Hopes new options can help it emerge from bankruptcy

BY PATRICK THIBODEAU

Silicon Graphics Inc. last week added low-cost options, including an x86-based server, to its product line, as it continues its effort to return to profitability after its bankruptcy filing in May. The company also brought out new midrange and high-end systems.

SGI moved to extend its low-end offerings because it faces competition from makers of high-performance systems that are building clusters of lower-cost x86 systems. At the same time, SGI will continue broad use of Itanium processors in its midrange and high-end systems.

The new low-end systems "will appeal to us, because we're an existing customer, we have a relationship with SGI and its support staff, and we know the company and the people," said David Roach, director of the Mississippi Center for Supercomputing Research. "Whether it appeals to others outside of that community is yet to be determined."

Roach said SGI's success in its new x86 line will depend on software, pricing and how aggressively the company markets it. "I think the jury is still out on how successful it will be overall," he said. "Hopefully it will be."

The supercomputing center hardware includes a 192-CPU SGI Altix 3700 supercomputer and a 128-CPU SGI Origin supercomputer.

The new low-end Altix SE line includes both x86-based systems and systems running the latest dual-core Intel Xeon 5100 processors, also known as Woodcrest.

Jill Matzke, SGI's high-performance computing marketing manager, said the company added the x86 systems because "obviously, one of the things we need to [do] is expand our market reach."

The new midrange Altix 450 blade server offers performance that's about 2.5 times better than that of the current Altix 350 system. It will ship this month; pricing begins at about $14,000.

At the high end, Mountain View, Calif.-based SGI unveiled the Altix 4700, which can scale to more than 1,000 processors on blade servers. It is shipping now and is priced from about $75,000.

SGI filed for Chapter 11 bankruptcy protection in May after posting several quarterly losses in recent years. In March, SGI cut its workforce by 12%, or 250 workers.

Analysts have cited competition from low-cost x86 vendors as putting a strong squeeze on SGI's financial results.

"The problem is that you need to sell a lot of those kinds of [low-cost] boxes," said Gordon Haff, an analyst at Illuminata Inc. in Nashua, N.H. Even so, "SGI probably wishes they had gone down the x86 route" earlier, he said.

Roach said the new products should help the company stem its losses. "We are hopeful that SGI's financial situation will improve," said Roach. "I think they've taken the right steps to put themselves on a more stable financial footing. Whether or not that's successful is yet to be determined." ▸

NEW PRODUCT

SGI Low-End Altix Systems

- Priced from $3,100
- Starts shipping in August
- Supports Red Hat Enterprise Linux 4
- Supports Novell SUSE Linux Versions 9 and 10
- Includes SGI's ProPack for Linux software

Austin to Host New Orleans Data Center

BY SHARON FISHER

The CIOs of Austin and New Orleans met last week to work on plans for a data center in Austin that would keep New Orleans municipal functions running in the event of a natural disaster.

The city of Austin is providing the space at minimal cost.

Work is expected to be completed within 60 days, said Pete Collins, Austin's CIO, who met with New Orleans CIO Greg Meffert in Austin. Collins wouldn't disclose the location of the data center.

The data center will include a 10-blade Dell server, Cisco routers and tape backup systems. The server will run Microsoft SQL Server, as well as other essential city systems, including general ledger, accounting and e-mail applications, Collins said.

Collins said he did not know the value of the equipment to be installed in the data center.

Data entered into systems at the New Orleans data center will be replicated to the Austin operation, probably through utilities in SQL Server, he said.

Should a disaster like Hurricane Katrina occur again, New Orleans city staff could travel to Austin to keep the government running, Collins said. The systems could also run from another location via the Internet, he noted.

Because the state of Texas prohibits giving away city services, the cities are calculating the cost of electricity and other utilities, which will probably come to less than $5,000 annually, Collins said.

Austin will also receive less-tangible benefits, Collins noted. For example, Austin officials can take advantage of the experience New Orleans officials gained last year in assembling their own disaster recovery plans.

New Orleans approached Austin officials about four weeks ago to discuss the plan, Collins said.

Cal Braunstein, CEO of Robert Frances Group Inc., said that Austin is probably far enough inland to be a good location for the New Orleans backup data center.

Braunstein cautioned, however, that New Orleans must create a plan to get workers out of the city quickly in an emergency to ensure that they reach a safe location to keep the Austin center running. If not, he said, New Orleans would risk having its workers trapped, he said. ▸

New PeopleSoft Apps Improve Fusion Links

BY MARC L. SONGINI

Oracle Corp. last week unveiled Version 9 of the PeopleSoft Enterprise applications. The new version offers tighter links to Oracle's Fusion Middleware than its predecessor version, Oracle said.

The integration with Fusion will help users of the Enterprise 9 software to take advantage of features in Oracle infrastructure applications, including XML Publisher and the Customer Data Hub data-cleansing product, according to Oracle officials.

The tight links to Fusion will also provide Enterprise 9 users better access to Web services technology and to the Oracle BPEL Process Manager tool, the company said.

Some users have been fearful that Oracle's next-generation Fusion applications, which will use the Fusion Middleware, will force an unneeded shift to the new products. The Fusion line of applications is slated to ship in 2008.

One user said the new release could help persuade skeptical users to try out the Fusion technology.

Jim Prevo, CIO at Green Mountain Coffee Roasters Inc., a PeopleSoft Enterprise shop in Waterbury, Vt., said that Enterprise 9 can provide users with an evolutionary path to the Fusion middleware.

"I expect [Enterprise 9] will be a stable version that offers customers the opportunity to kick the tires on Fusion Middleware," he said.

Prevo said he expects that most companies will avoid a quick move to the new Fusion applications, even with the opportunity to try out the technology. "I suspect most will stay put as long as PeopleSoft applications continue to evolve and improve over time," he said.

Doris Wong, the newly appointed general manager of PeopleSoft Enterprise, said that the first Enterprise module, Enterprise Learning Management 9, began shipping last week. The full Enterprise 9 suite is expected to be shipping by year's end, she said.

The updated Learning Management module includes an improved talent management tool to assist in training and certifying employees. The updated tool can be used to preemptively alert managers when employees need to be certified in a given process or be trained by a set deadline, said Gretchen Alarcon, Oracle's vice president of human capital management strategy.

The application's CRM and Enterprise Performance Management modules will ship next, the company said without disclosing further delivery details. ▸

NEW PRODUCT

PeopleSoft Enterprise 9 will include:

- **A corporate governance application** to help with compliance with regulations such as the Sarbanes-Oxley Act.
- **An enhanced CRM module** with new tools for customer service agents.
- **An improved Enterprise Performance Management module** that adds high-level planning and analysis tools.

Continued from page 1

Ultrafast

that could also cost up to $200 million. And this month, the Defense Advanced Research Projects Agency (DARPA) plans to award contracts valued at several hundred million dollars for two even larger supercomputers.

Planning an Approach

The scale of the computing power in the new systems will be so enormous that "we have to change the way we do computational science to really take advantage of these machines," said Dimitri Kusnezov, head of the DOE's advanced simulation and computing program, which operates the most powerful supercomputer in the world today, the IBM Blue Gene/L. That supercomputer, with more than 131,000 IBM Power processors, was easily the No. 1 system on the latest Top500 list.

"The question is, what would [scientists] do with an infinite amount of computing speed?" said Kusnezov. "What would they calculate? And I'll wager that they don't have an answer for you."

Kusnezov said petascale computing levels will likely force researchers to assemble multidisciplinary teams to task the systems with solving fundamental scientific problems.

Three vendors — IBM, Cray and Sun Microsystems Inc. — have been working with DARPA for several years on initial research for the next generation of computer systems. Next month, the agency is expected to pick two of the three vendors to work on the next phase of the project. DARPA's goal is to build an "economically viable" petascale supercomputer, according to an agency spokeswoman. DARPA expects development of the system to last four years, she said.

IBM

With more than 131,000 IBM Power processors, BLUE GENE/L is the world's most powerful supercomputer, according to the latest Top500 list.

The NSF also wants a petascale system and is seeking proposals — due next February — for a supercomputer that can answer key questions about the kinds of abrupt transitions that can occur in the Earth's climate and ecosystem structure. It wants the system to be ready by 2011.

Stephen Meacham, IT research program director at the NSF, said the agency wants to use the system to attack "frontier problems," such as modeling the interaction of viruses with various components in a cell and looking for ways to block those interactions.

Although much of the focus on supercomputers is on the number of processors being strung together, more vexing problems involve memory and storage subsystems and energy consumption, which "begin to take up a good chunk of the overall cost of the system," said Dave Turek, vice president of deep computing at IBM.

The next-generation Blue Gene system, Blue Gene/P, aims to deliver petascale performance with only a 10% to 15% increase in power consumption, Turek said. IBM isn't disclosing details or shipment plans for the system.

Turek said the most important goal is building low-cost, high-performance systems that businesses can use, in order to extend the systems' use beyond government agencies.

To help support that cause, legislation was introduced in the U.S. Senate last month to set aside $25 million to fund up to five supercomputing centers for assisting businesses and manufacturers. Sen. Mike DeWine (R-Ohio) and Sen. Herb Kohl (D-Wis.) sponsored the bill.

The legislation, called the Blue Collar Computing and Business Assistance Act of 2006, gets its name in part from the Ohio Supercomputing Center in Columbus, whose Blue Collar Computing initiative is intended to promote supercomputing in mainstream IT. ▸

Continued from page 1

EMC/RSA

Harvard Medical School and CareGroup Healthcare System in Boston. "It is two vendors I trust, and having them under one roof gives synergy."

Halamka added that he hopes to use tools from RSA to ensure continued compliance with the Health Insurance Portability and Accountability Act. The law requires that records be kept of who views medical data and that medical records not be altered.

Halamka, a *Computerworld* columnist, also said he expects that EMC will integrate RSA technology into its storage products, much like it did with previous acquired products.

Scott Saunders, director of MIS for Ion Media Networks Inc., a broadcast television network based in West Palm Beach, Fla., said the acquisition makes sense for EMC because it expands the company's software line and reduces its dependence on hardware.

However, he did express some concern that the RSA acquisition may dilute EMC's business focus. "When a company sucks up so much different stuff, you have to see whether they keep their focus on the quality of the products," he noted.

When the acquisition is completed, likely by this fall, RSA will operate as EMC's information security division and continue to be headquartered in Bedford, Mass.

Art Coviello, president and CEO of RSA, will become an executive vice president at Hopkinton, Mass.-based EMC and president of the division, officials said.

Phil Shacter, an analyst at Midvale, Utah-based Burton Group, said there's no obvious short-term gain in the deal for EMC. But over the longer term, RSA's technologies will let the storage vendor offer strong access-control and auditing capabilities on top of its storage management products, he said.

"EMC has this major role as custodian of important corporate data," Shacter said. Giving customers a better way to protect that data makes sense for EMC, he said.

Jonathan Penn, an analyst at Forrester Research Inc., said that RSA's encryption and key-management technologies are likely to be of immediate interest to EMC. Over the long haul, EMC users can expect to see more identity-driven access-control capabilities built into the vendor's storage management products, he said.

Acquisition Trend

The EMC/RSA deal echoes the union of security firm Symantec Corp. and storage vendor Veritas Software Corp. in July 2005, when Symantec bought Veritas for about $13.5 billion in stock.

Noting that RSA was also approached by other undisclosed suitors, Tucci said that not acquiring the company and having to develop its own security technologies to add to the EMC product line "would have put us at a severe disadvantage."

Gartner Inc. analyst John Pescatore was skeptical about whether the two companies can be easily blended.

"EMC is trying to make it look like all of the RSA piece makes sense," said Pescatore. In fact, only a small portion of RSA's portfolio is likely to be of use right away in bolstering EMC's existing storage management capabilities. RSA's SecureID product, one of its biggest sellers, is unlikely to be of much use to EMC's storage customers, he said.

Like Symantec's purchase of Veritas, EMC's acquisition of RSA faces a lot of challenges, Pescatore said. "Seventy percent of big acquisitions don't work," he said. "I don't think anyone will say the Symantec and Veritas deal has been a screaming success so far. At this point, there's nothing about this one either that jumps out and says it will be a screaming success."

WEBB CHAPPELL

Because of the importance of keeping data secure, "the marriage of RSA and EMC makes complete sense," says JOHN HALAMKA, CIO at CareGroup Healthcare.

Brian Babineau, an analyst at Enterprise Strategy Group Inc. in Milford, Mass., disagreed, saying RSA's tools could help allay users' growing concerns about data security. In addition, he said, the RSA tools could help EMC meet the requirements of security and privacy legislation proposed in Congress in the wake of recent data breaches.

Babineau dismissed any comparison to the Symantec/Veritas deal. "There, you had a consumer business and an enterprise business coming together. Here, you have two enterprise businesses that sell to different organizations, with one looking to expand their horizons and the other looking for an exit strategy." ▸

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Microsoft

GLOBAL DISPATCHES

An International IT News Digest

European Official Raps German Telecom Plan

BRUSSELS

A EUROPEAN COMMISSIONER last week threatened legal action against Germany if its government passes a telecommunications law as the measure is currently drafted.

The draft law would grant a so-called regulatory holiday to Deutsche Telekom AG, giving the Bonn-based company a temporary exemption from European Union rules designed to open the telecommunications market to competition. The idea behind the proposal is to provide Deutsche Telekom with time to absorb the cost of recent investments.

But in a speech at the Bitcom conference here, Viviane Reding, the European commissioner who is in charge of telecommunications issues, warned that the EC would "start infringement proceedings against Germany if the draft should become law without substantial changes."

"The commission is concerned about all obstacles to competition, whether today, tomorrow or in the long term," Reding said. "We therefore do not accept monopolistic situations, even if we are promised that they would only last for four or five years."

The German move could also trigger copycat actions in other EU countries, Reding said, adding that the approach "sets a very dangerous precedent."

■ PAUL MELLER, IDG NEWS SERVICE

Vendor Shuts R&D Subsidiary in India

BANGALORE, INDIA

PERVASIVE SOFTWARE INC., a maker of database and integration software, disclosed last month that it was closing its development subsidiary here and consolidating the operations into its Austin-based facilities.

In a statement, Pervasive CEO John Farr cited the complexity of managing an offshore operation, as well as increasing labor costs and employee turnover. Pervasive also said it plans to hire up to 20 technical workers in Austin over the next several months. The company had employed about 50 people at the unit in India.

The move didn't surprise Siddharth Pai, a partner at Houston-based consulting firm Technology Partners International Inc. Pai said smaller companies such as Pervasive can't easily realize savings from offshore operations. Businesses setting up development or services operations in India often miscalculate the amount of management bandwidth and effort required to make them successful, he added.

Pervasive's withdrawal from India follows a similar decision by Apple Computer Inc., which shut down its Bangalore support center in May, just a month after it opened with 30 staffers.

■ JOHN RIBEIRO, IDG NEWS SERVICE

GLOBAL FACT

$16B

Projected spending on outsourcing in 2010 by companies in the Asia-Pacific region, excluding Japan. Last year's spending totaled $9.58 billion.

SOURCE: IDC, FRAMINGHAM, MASS.

Microsoft Faces Fines Over Antitrust Ruling

BRUSSELS

THE EUROPEAN COMMISSION today will likely propose fines amounting to as much as €460 million ($576 million U.S.) against Microsoft Corp. for failing to comply with an antitrust ruling imposed by the EC two years ago, sources said.

A final decision on the fines could be made by the EC as soon as July 12 if competition regulators from the European Union's 25 member states support the commission's proposal, they said.

The EC ruled in 2004 that Microsoft had abused its dominant position in the operating systems market, partly by denying competitors access to documentation for its Windows protocols. The possible fines stem from a subsequent ruling last December that the software vendor had yet to comply with the EC's mandate that it submit the required technical documentation.

Commission spokesman Jonathan Todd declined to comment on the draft decision but confirmed that its release was imminent.

"Any fine would be unjustified and unnecessary," Horacio Gutierrez, associate general counsel at Microsoft Europe, said in a statement. He added that Microsoft has committed "massive resources" to meeting the requirements of the 2004 ruling and is working to meet a July 18 deadline for handing over the last of seven installments of documentation.

Microsoft could be fined even if the documentation satisfies regulators, said a person close to the case. "Even if they change their ways, that doesn't get them off the hook for the period starting last December," the source said.

■ PAUL MELLER, IDG NEWS SERVICE

EBay Adopts New Strategy in Taiwan

TAIPEI

EBAY INC. said it plans to lay off most of its workforce in Taiwan and turn over its local online auction operations to an Internet portal operator based in Taipei.

The San Jose-based company plans to shut down its own auction site in Taiwan and jointly launch a new site with PChome Online Inc. PChome, which will also close its Web site in favor of the new one, will run the day-to-day operations of the joint venture.

"We'll lay off most of our workforce, but some of them may be able to find work at the new company," said a spokeswoman for eBay Taiwan. The unit has about 40 employees.

The spokeswoman declined to say why eBay, which entered the Taiwanese market in 2002 via an acquisition, is now teaming up with PChome. She said that the companies have yet to set a date for starting the joint venture.

■ DAN NYSTEDT, IDG NEWS SERVICE

Intel Invests in Four Chinese Firms

TAIPEI

INTEL CORP.'S venture capital arm last week disclosed investments in four more companies through its $200 million (U.S.) China Technology Fund, bringing to 12 the number of investments it has made in the country since the fund was set up in June 2005.

The latest businesses that Intel is investing in include Montage Technology Co., a chip designer in Shanghai; Star Softcomm Pte., a vendor of PC management software in Beijing; Winking Entertainment Ltd., a developer of software for 3-D online games in Shanghai; and Campus Media Group Inc., which runs an advertising network in university cafeterias across China.

Altogether, Intel Capital has invested in more than 50 companies in China since 1988.

■ DAN NYSTEDT, IDG NEWS SERVICE

Compiled by Mike Bucken.

Briefly Noted

Research In Motion Ltd. said it will soon launch its BlackBerry wireless e-mail service in Taiwan, via a deal with Taipei-based Taiwan Mobile Co. Waterloo, Ontario-based RIM wouldn't disclose pricing information or specify a launch date, saying only that the service will become available this summer.

■ DAN NYSTEDT, IDG NEWS SERVICE

EMC Corp. said it will open a software development center in Shanghai that is expected to employ 100 workers by year's end and 500 by the end of 2008. EMC didn't disclose the planned cost of the new facility but said it is part of an overall investment of $1.2 billion in global research and development.

■ STEVEN SCHWANKERT, IDG NEWS SERVICE

The **Philippine House of Representatives** has allotted 100 million Philippine pesos ($1.8 million U.S.) to provide wireless Internet connectivity for the country's lawmakers. In a speech last week at the VoIPCon conference in Pasay City, House Speaker Jose De Venecia said the effort will transform the House of Representatives into a hot spot for wireless voice over IP.

■ LAWRENCE D. CASIRAYA, COMPUTERWORLD PHILIPPINES

Nokia Corp. in Espoo, Finland, and Giesecke & Devrient GmbH, a Munich-based maker of smart cards, have set up a joint venture that will develop and operate a secure electronic payments service for cell phone users. The service will support phones equipped with near-field communications technology for short-range wireless transmissions, the two companies said.

■ NANCY GOHRING, IDG NEWS SERVICE

Toshiba Corp. said last week that it plans to build a ¥2 billion ($17.2 million U.S.) factory near Bangkok, Thailand, that will make chips for consumer electronics equipment and mobile phones. Construction is scheduled to begin this month and be completed by next March. The Tokyo-based company's Toshiba Semiconductor (Thailand) Co. subsidiary will operate the plant, which is expected to employ about 900 people.

■ MARTYN WILLIAMS, IDG NEWS SERVICE

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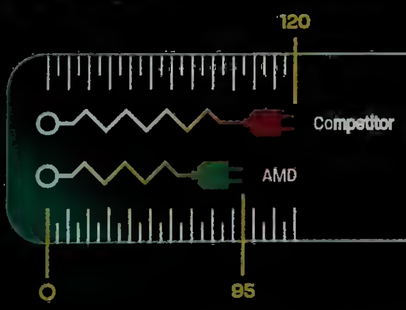

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Frontier Hopes Solaris Upgrade Boosts Web Bookings

BY PATRICK THIBODEAU

Frontier Airlines Holdings Inc. last month shifted from Windows- to Solaris-based back-end systems to support its Web site as part of an effort to boost online bookings.

Frontier gets about 30% of its passenger revenue through online bookings and hopes to increase that percentage to 50% in the next year using the new Web servers. The airline's total passenger revenue in fiscal 2006, which ended March 31, was $878.7 million.

Bob Rapp, CIO at Denver-based Frontier, said the shift is expected to help the airline improve Web site functionality and performance and make it possible to offer incentives such as free in-flight TV to passengers who book online.

"The underlying technology was really meant [to provide] a foundation on which we can grow," he said.

Boosting Performance

Last month, Frontier completed the migration to a J2EE environment with Sun servers that run Solaris and use Advanced Micro Devices Inc.'s Opteron chips. The system can handle about 500,000 transactions per hour, about 10 times more than the older one could, said Rapp.

Rapp said the move to Solaris will also improve the system's ability to work with the Unix-based booking engine of its reservation systems provider, Sabre Holdings Corp.

Frontier began using Sabre just over a year ago, said Rapp, and "we felt that if there were any technical issues, we could step through [them] more coherently with this particular technology platform."

Web sites are "incredibly critical to an airline's survival, because financially, the cost of a sale through a Web site is generally much lower," said Henry Harteveldt, an analyst at Forrester Research Inc.

For instance, processing a booking through a Web site can cost an airline less than a $1, he said. A reservation that's booked through a call center can cost between $8 and $16, Harteveldt said.

The industry leader in online bookings is Forest Hills, N.Y.-based JetBlue Airways Corp., which at the end of 2005 reported that 77% of its bookings were made by customers using its Web site.

According to a survey taken between May 20 and June 20 by Lexington, Mass.-based Gomez Inc., Frontier scored above the airline industry benchmark average with a 4.13-sec. response time. The average is 5.596 sec. One of the fastest-loading Web sites is run by Orlando-based AirTran Airways, which has achieved a 1-sec. response time, according to Gomez. ▸

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GAO Calls on VA, DOD to Better Share Medical Data

BY LINDA ROSENCRANCE

The U.S. Department of Veterans Affairs and the U.S. Department of Defense must improve efforts to standardize health records, the Government Accountability Office said in a report released late last month.

Although both agencies have made some progress in recent years in creating systems for sharing the health information of their patients, a clearly defined project management plan is still needed, the report said.

The GAO report found that the eight-year joint effort to create a system to share data has experienced delays and that the agencies have yet to fully populate repositories that will store health-related data from both organizations.

The GAO also questioned the conclusion of a 2004 DOD/VA report that said the Federal Health Information Exchange program, which facilitates the secure exchange of data between the Defense Department and the VA, was fully operational. The GAO report noted that the DOD hasn't even captured all of its own medical data in its health information system.

In testimony last week about the report before the Senate Homeland Security Subcommittee on Federal Financial Management, Government Information and International Security, GAO official Linda Koontz suggested that the two agencies develop "an electronic interface that will enable VA and DOD to exchange computable patient medical records."

Benefits Sought

Such "a highly complex undertaking could lead to substantial benefits — improving the quality of health care and disability claims processing for the nation's service members and veterans," said Koontz, the GAO's director of information management issues.

In a statement, Carl Hendricks, military health system CIO at the Pentagon, said that the "DOD and VA share health information today. The departments continue to pursue enhancements to information management and technology initiatives to significantly improve the secure sharing of appropriate health information."

Michael Kussman, the VA undersecretary of health, said the agencies' interoperability efforts are guided by the DOD/VA Joint Electronic Health Records Interoperability Plan, which consists of a series of initiatives that provide the agencies with a comprehensive strategy for sharing health data.

"The plan is closely aligned and dependent upon parallel developments in the health data standards industry, so that as standards and technologies mature, interoperability will increase," Kussman said. ▪

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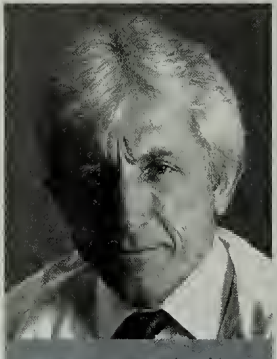
DON TENNANT

Pointing in the Mirror

WE'VE ALL SEEN IT: An IT vendor does something so stupid that it's downright befuddling. "How could a company with so many smart people be so dumb?" we ask. "What were they *thinking*?"

One of the dumbest vendor moves I've seen in a long time was made last week by the geniuses at Oracle. These guys thought it would be a really good idea to place a big ad in *The Wall Street Journal* that read simply, "Computer Associates (CA) Runs SAP." At the bottom of the ad was Oracle's logo and contact information. That's it.



DON TENNANT is editor in chief of *Computerworld*. Contact him at **don_tennant@computerworld.com.**

The inference, of course, was that the recent history of high-profile, image-tarnishing accounting difficulties suffered by CA is somehow related to an SAP implementation at the beleaguered company. Go ahead and run SAP — look what it did for CA.

It's no secret that SAP is Oracle's archenemy, the one company that stands in the way of Oracle's worldwide domination of the ERP market. It's therefore no surprise that Oracle is prepared to go to extreme lengths to instill fear, uncertainty and doubt about SAP. What better way than to associate SAP with a customer whose recent history is the worst nightmare of every corporate executive, including those with ERP software buying power? OK, so it's not exactly a gentlemanly approach. Tough competitive times call for some tough action, right?

Well, perhaps. But guess what. CA runs *Oracle*, too. So you can well imagine how this particular Oracle customer was thrown for a loop.

"I was more than surprised — and quite frankly, disappointed — to see their ad," CA spokesman Bill Hughes told *Computerworld*'s Marc Songini, who covers the ERP market for us and brought the ad to my attention. "Especially since we are an Oracle customer and a certified partner."

SAP was probably less surprised but equally put off. "This is first and foremost an issue of values and decency," an SAP spokesman told Songini. "Businesses should think long and hard about what kind of company would throw its own customer under the bus for the sake of a competitive marketing ploy."

I find it difficult to disagree with that assessment, so I thought it was only fair to get Oracle's response to it. Unfortunately, Oracle declined.

Oracle did respond to the CA spokesman's comment, if somewhat obliquely and unapologetically.

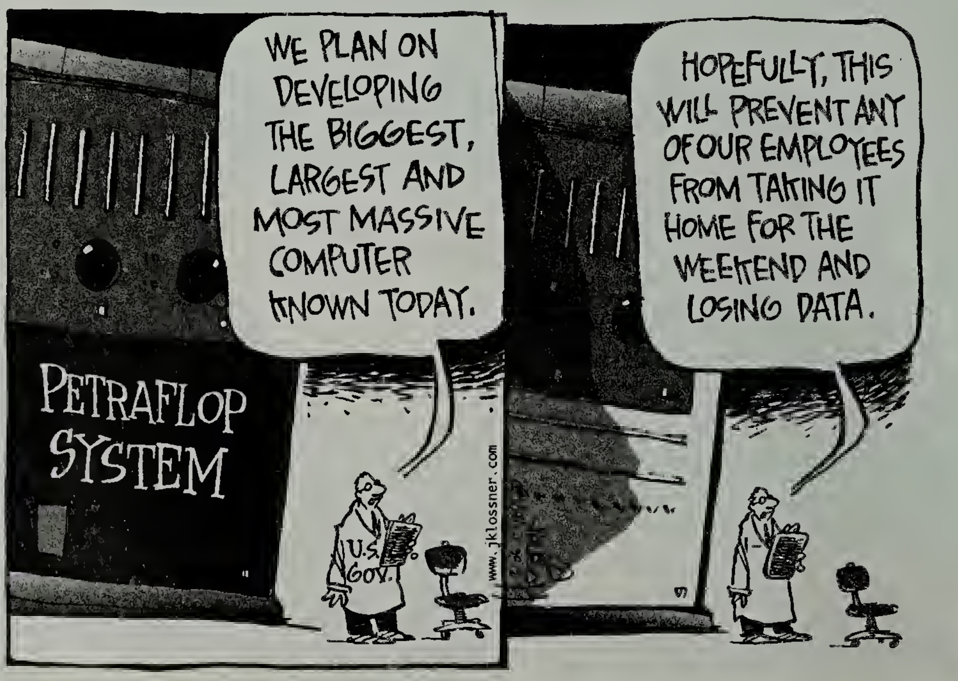
"We stand ready to assist CA in any way we can with their technology needs," said Bob Wynne, Oracle's vice president of corporate communications.

According to Wynne, the intention of the ad was to "raise awareness of the complexity and costs associated with SAP implementations." I suppose the reader was just supposed to assume that CA's problems stemmed from a costly, complex SAP rollout.

In any case, Oracle is hardly in a position to do a lot of finger-pointing. All ERP implementations are costly and complex, including those from Oracle. And Oracle has certainly had its share of embarrassing failures. Just last month, Gerard Groenewold of the University of North Dakota called the university's rollout of Oracle's PeopleSoft Enterprise 8 software a budget-breaking, deadline-missing "train wreck." And six months after Invacare Corp. reported a $30 million quarterly revenue shortfall that it blamed on a problematic Oracle ERP implementation, I doubt anyone there would have much patience with Wynne's comment.

If that ad tarnished anyone's image, it was Oracle's. The people at Oracle should have thought this one through. They would have recognized that, like most finger-pointers, they were pointing in the mirror. ▸

Don Tennant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VIRGINIA ROBBINS

How to Show You're A Leader

A GRADUATE STUDENT wrote to me to ask whether he should get his MBA and whether it would be possible to demonstrate leadership as an embedded software engineer. They're good questions, so let me share what I told him.

I have met successful CIOs who don't have MBAs. In the banking industry, you can become a CIO if you have 15-plus years of experience working on one of the handful of banking systems used by community banks. Such MBA-less CIOs leverage their deep business experience and extensive knowledge of the industry's specialized software to strategically add value every day.

VIRGINIA ROBBINS is a former CIO and is now chief operations officer at North Bay Bancorp in Napa, Calif. Contact her at **vrobbins@sbcglobal.net.**

But I believe education is extremely important. For me, having my MBA enables me to understand more readily how my CEO and my chief financial officer make decisions. I am able to speak their language, which helps me gain their confidence and advance my career more quickly. So, yes, get your MBA, or be prepared to work really, really hard for 15 years in one industry.

As for the second question, one of the best ways to demonstrate leadership when you're working in a role that doesn't offer many leadership opportunities is to help make meetings more productive. I usually see a great deal of eye rolling when I give this advice, but if you help make one meeting more productive, you increase not only your own productivity, but also that of everyone else in the room. Helping people be more productive is one of the key components of positive business leadership.

We've all experienced bad meetings at work, with volunteer groups or with committees at our children's schools. Many things can contribute to a bad meeting: It might not start on time, it might run long, or it might cover the same issues over and over again without a decision being made. Such meetings feel like a huge waste of time. When I was younger, I'd sit stewing in meetings like those and then afterward join in a postmeeting gripe session, where we all complained about how bad the meeting was. I was doubling my waste of time! It wasn't until I was a bit older that I realized that by being in the room, I had a responsibility to make the meeting better.

There are lots of books on the topic of managing meetings. My favorite is *Great Meetings! Great Results*, by Dee Kelsey and Pam Plumb (Hanson Park Press Inc., 2004). And whenever you have the good fortune to attend a particularly good meeting, talk to the facilitator afterward to learn everything he did that contributed to its success.

But don't think that after you've read a book or had a conversation with a good facilitator that you can just march into your next meeting and tell the facilitator what to do. That's no more constructive than sitting around complaining after the meeting is over.

A better technique is to plan how you would manage the meeting and then ask the facilitator a few days before the meeting if he could help you by letting you practice some new skills. After the meeting, ask the facilitator what he thought. Listen, think about his comments, and ask if you can practice at another meeting.

After your next bad meeting, be prepared to volunteer. The facilitator may be so glad to get rid of the job that he may want you to be the facilitator from then on. If that's the case, congratulations — you've just been handed your first leadership role. ▸

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JOHN D. HALAMKA

Technology Is Good; Privacy Is Personal

AS A PHYSICIAN at a Harvard-associated teaching hospital, I live in a world of electronic health records, with terabytes of data, images and patient telemetry moving over a 20,000-node secure network.

JOHN D. HALAMKA is CIO at CareGroup Healthcare System, CIO and associate dean for educational technology at Harvard Medical School, chairman of the New England Health Electronic Data Interchange Network, CIO of the Harvard Clinical Research Institute and a practicing emergency physician. Contact him at **jhalamka@caregroup.harvard.edu**.

As a CIO, I'm responsible for protecting the confidentiality of 3 million electronic patient records. In an era of sophisticated hackers and well-publicized privacy spills, I'm often asked if paper would be more secure.

The answer is not entirely clear.

It's likely that I could put on my white coat and walk into any hospital in the country, pick up a paper chart, copy it, make a PDF of private records and index them on Google, all without any audit trail of what I'd done. With this social engineering type of security breach, I could compromise the privacy of a few records.

Electronic records can be audited, secured, encrypted and subjected to numerous business rules such as "only authorized physicians with a preexisting care relationship to the patient can see those records that a patient has consented to release." All lookups are audited, and violators can be fired. But if electronic records are compromised, thousands of patients could be affected.

Which would you choose: a paper record that could be stolen without anyone knowing, or an electronic record that is highly secure but in theory might be compromised by a hacker?

To answer that question, you need to understand the risks and benefits.

Do you do electronic banking? If so, you probably see the convenience of managing your money via a browser as outweighing the small risk that your account might be hacked.

In the case of electronic health records, people have various thresholds for the privacy of their data. In various Massachusetts electronic-record pilots, we've found that up to 98% of patients believe the benefits of shared, interoperable electronic records outweigh the risks of a potential privacy spill.

Those benefits are many: Clinicians can coordinate your care, avoid dangerous medical errors and ensure that you receive the most appropriate care to save your life. A paper record is often not available, since only the person who has it in hand can view it. And paperwork is frequently not yet filed by the time a person returns for a follow-up visit. With a few exceptions, electronic data is accessible as soon as it is entered and is available concurrently to all authorized users.

The only way to balance high-quality medical care and privacy is to let the patient decide. In Massachusetts, we are moving forward with a project that will enable patients to decide whether they want to opt into the appropriate secure sharing of electronic health records. With opt-in at each site of care, a patient can decide if his cardiology records, mental health records or primary care records meet his personal test of risk vs. benefit. Records that a patient does not want shared will never be available over the network, not even via a "break the glass" feature for emergencies. As a result, if hacking should ever occur — unlikely though that may be — the patient will have made the decision about risk with a full understanding of the consequences.

As a country, we're spending 16% of our GDP on health care. IT is seen as a means to control escalating costs. My belief is that the technology is good and we should build the secure health care information superhighway. But it should be up to the patients to decide whether they want to drive on it. ▸

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READERS' LETTERS

Two Sides of the IT Union Question

I HAD ALWAYS thought that unions in high tech would lower the level of knowledge and experience ["IT Union Head Opposes H-1B Increase, Seeks Aid for Workers Hit by Offshoring," April 24]. When I was in college, I worked summers at a plant that was unionized. It seemed that unions protected the worst of the membership while giving few benefits to the workers who really toiled. But maybe I was wrong.

Last year my job was offshored to India. As I looked for a new job after 42 years in the industry, I found that employers liked the depth and breadth of my experience, but not my age. Or they wanted 20 years of experience for a two-year-old technology. Luckily for me, I am 63 1/2 years old, so when unemployment ran out after six months, I was able to take early Social Security retirement.

If unions could have reduced the H-1B levels or caused labor reform when companies chose offshoring, I would probably have joined one and become an active voice.

Ronn Williams
Dallas

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WHAT DO YOU expect to hear when you interview a union official? It is no coincidence that the heavily unionized American manufacturing industry is suffering large layoffs as traditional industry tries to reduce its overhead stemming largely from the high wages and retirement benefits negotiated by unions in their heyday.

I live in a city dominated by aircraft manufacturing, and we've been seeing the market "adjustments" and subsequent layoffs for some time now. As an IT worker, I'm not interested in jumping on that roller coaster. About the only "successful" unions these days are those entrenched in the public sector (education, government), and that'll only last until voters decide to "lay off" the politicians who cater to those lobbies.

David Orr
Network security administrator,
Wichita, Kan.

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Tape Not an Option

SO IBM is going to turn out tape that can store a huge amount of data on one cartridge. In, maybe, five years ["IBM Researchers Extend Magnetic Tape Density," *Computerworld.com*, May 16]. You say that there *may* be a 1TB tape next year. But this year, small computer network users are faced with servers that typically have 200GB to 400GB of data to back up, and single tape drives that just barely hold that capacity cost more than half again the price of a new server – not to mention the cost of the backup software and tapes. Simply put, tape backup isn't affordable or reasonable for small installations; disk capacity has outstripped tape in affordability. That's why so many small businesses are moving to removable hard-drive backup systems. IBM may be targeting the Fortune 500 with "tape into the future," but essentially, tape has already died in the small-to-midrange market.

Dave Ihnat
President, DMINET
Consulting Inc., Chicago

COMPUTERWORLD welcomes comments from its readers. Letters will be edited for brevity and clarity. They should be addressed to Jamie Eckle, letters editor, Computerworld, PO Box 9171, 1 Speen Street, Framingham, Mass. 01701. Fax: (508) 879-4843. E-mail: letters@computerworld.com. Include an address and phone number for immediate verification.

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SECURITY MANAGER'S JOURNAL

No Rush to Give Russian Engineers Net Access

Mathias Thurman visits Russia to ensure that his company's outsourced software development operations are secure. **PAGE 28**

QUICKSTUDY

Backup Strategies

There are many ways to help your company avoid losing data, depending on what is backed up (and when, and to where), whether the technology uses compression and other factors. **PAGE 29**

Business on the Map

More and more companies are adopting mind-mapping tools to help clarify business structures, streamline planning and manage projects. **PAGE 26**

RALPH MASIELLO

new twist on displays

Technological advances could soon bring displays that can bend, conform to virtually any shape or roll up to save space.

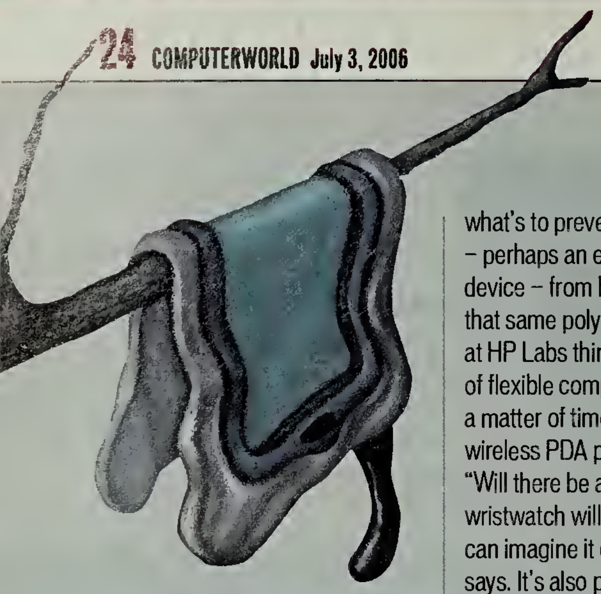
by robert l. mitchell

OVER THE next 10 years, thin-film polymers and other flexible substrates could change how people think about and use displays. In the future, you may “print out” reports to sheets of e-paper: flexible polymer displays about as thick as a sheet of paper that can be spread out on a desk for easy comparison and analysis and then reused when the work is done. Your PDA or cell phone may incorporate a roll-up display that extends to let you view maps or Web pages on a larger screen. Your laptop may have a secondary display on the back of the case that can maintain any image you choose, such as your schedule and to-do list — and you'll be able to refer to it even when the laptop is turned off. Some displays may be embedded on a shirt sleeve or curve around a watchband.

“We're talking about electronics we can wrap around a pencil,” says Jim Brug, imaging materials department manager at HP Laboratories. He says he expects such technologies to evolve into real product designs within five years.

While today's flexible display prototypes are relatively small, Hewlett-Packard Co. and many

EMERGING TECHNOLOGIES



From Flexible Displays to Bendable PCs

IF INK-JET PRINTING technologies can be used to lay down transistors for flexible displays today, what's to prevent other electronics – perhaps an entire computing device – from being embedded in that same polymer sheet? Jim Brug at HP Labs thinks the development of flexible computing devices is just a matter of time, as laptops and wireless PDA phones converge. "Will there be a world where your wristwatch will be your PC? One can imagine it coming out," he says. It's also possible that as more electronics are printed on polymer, they could be absorbed into the phone display, allowing contoured or even flexible, wearable designs.

Vendors are already working on embedding display driver circuitry onto polymer substrates, something that's done with today's glass-based displays. In addition, battery vendors such as Solicore Inc. in Lakeland, Fla., have developed flexible batteries that can be embedded into items such as radio frequency identification (RFID) tags and displays for smart cards. "We're taking the materials that are used for flexible electronics and embedding those into our battery," says Michael Mahan, vice president of business development at Solicore. Such devices, however, aren't strong enough to power a cell phone.

The ultimate goal, says Darren Bischoff, senior marketing manager at E Ink, is "having this lightweight, rollable display that has next-generation electronics built into it so you can include the processor, memory – everything you need – into this display material."

Building an entire PC on a flexible substrate would be tricky, although Brug thinks it's technically possible. Some of HP's earliest research on flexible electronics was done on memories, he says. "We won't be doing microprocessors anytime soon, but it won't be too long before the pieces start coming together," he predicts.

Bob Street, a senior research fellow at Palo Alto Research Center, says the issue isn't whether it can be done, but whether such a device can be created cost-effectively. He notes that attempts to print the antennas and transistors for RFID tags on a single sheet have so far been more expensive than using silicon and bonding the antenna to the chip. A flexible PC would be much more complex to engineer. "I'm sure you can do it," Street says. "The question is whether it is cost-effective versus doing it with crystalline silicon."

– ROBERT L. MITCHELL

other companies are working on flexible screens that measure as large as 14 inches diagonally. But the goal is to complement current LCDs rather than provide a substitute for them.

"It's a mistake to think of this as a replacement for a [desktop or laptop] display," says Brug. "This is really a new way of using surfaces for information." That might include interlocking flexible panels, like sheets of wallpaper, to create a single, wall-size screen, he says.

Why LCDs Won't Bend

Making traditional displays flexible presents several challenges. An active-matrix LCD consists of two layers of glass with several components in between: a thin-film transistor (TFT) layer embedded in amorphous silicon and etched onto the bottom glass, which produces the light pixels, and a liquid-crystal layer on top that acts as a light shutter. A backlight sits beneath the display, while a color filer and polarizers sit above the LCD. Creating a flexible display involves eliminating the backlight and replacing the glass layers with a flexible substance such as a thin polymer film.

The problem is that the liquid crystals in LCDs don't like to bend. "The quality of the image depends on the cell gap" between the polymer layers, says Kimberly Allen, director of display technology and strategy at iSuppli Corp. in El Segundo, Calif. The LCD will distort the image if the gap between the two layers isn't uniform when the substrate flexes. Also, an LCD with contoured surfaces can be difficult to view because of the angle.

A number of companies are working on developing alternative technologies to enable the production of flexible displays, including reflective "e-paper" and emissive organic light-emitting diode (OLED) technologies.

Researchers are looking for flexible alternatives to amorphous silicon, the semiconductor material used to construct the TFT and embed it on a glass substrate. Traditional manufacturing techniques require high temperatures that work on glass but would melt plastic substrates. Researchers are experimenting with "ink jet" printing of the transistors onto a thin polymer sheet. This requires moving from inorganic silicon to soluble, organic materials. HP is also testing imprint lithography, where a circuit pattern is pressed onto the polymer. Researchers at Palo Alto Research Center Inc. are also working with a stainless-steel foil substrate that can withstand high temperatures.

E-paper displays are called "bistable" because they can maintain an image when the power is turned off. Reflective displays don't require a backlight, as LCDs do, and can be read outdoors. The first generation has been used in signage, store-shelf price labels and e-book readers.

OLEDs emit their own light. They use more power than today's active-matrix LCDs but offer faster performance and richer colors. But manufacturing OLEDs on a flexible substrate presents challenges.

Sales of flexible displays are expected to grow to almost $340M annually in 2013.

SOURCE ISUPPLI CORP., EL SEGUNDO, CALIF.

"OLEDs are probably further away than [e-paper] because OLEDs require a strong barrier against moisture, and plastic lets that right through," says Allen. Researchers have also had problems with display life spans, particularly with OLEDs that produce blue light, although some say that life spans have improved in the past few years.

Flexible displays are still under development or in the prototype stages for both e-paper and OLED technologies. "There are no displays that are dynamically flexible that are currently being used," says Allen. But she predicts that the market will ramp up from virtually nothing today to about $338 million annually by 2013.

Bistable Bendables

Among vendors of bistable displays, E Ink Corp. in Cambridge, Mass., is the best known. Its technology consists of a thin film atop a layer of electronic ink — a series of black and white charged particles, or "pigments," suspended in a fluid that move up or down to create a black, white or gray image. So far, display manufacturers have used E Ink's technology to create e-book readers and what Mike McCreary, vice president of research and advanced development, calls "conformative displays" that are initially contoured to fit the shape of an object but remain rigid in the final product. Seiko Corp. has developed a watch display, for example, and Lexar Media Inc. has embedded a capacity meter for USB memory sticks using the technology. E Ink displays are also being used in a flexible electronic newspaper that's being tested in 200 households in Belgium.

Sipix Imaging Inc. in Fremont, Calif., uses a similar technology to produce black, green or blue colors on a white background. Polymer Vision is working with Sipix and E Ink to create a rollable display prototype called the Readius. "We are enabling very small devices with large displays," says Edzer Huitema, program manager at Eindhoven, Netherlands-based Polymer Vision. The 5-in. pull-out display will offer 16 levels of gray. The device refreshes about once per second — too slow for menu navigation or video but acceptable for portable navigation systems or as a Web news or e-mail reader.

Huitema predicts that Sipix will ship the device in the first half of 2007, with color and touch-screen capabilities available by 2010. E Ink is working on a color filter for its technology that it expects to be ready in the same time frame.

NTera Ltd. in Dublin is developing a flexible, conformable bistable display based on its nanochromic technology. Instead of moving particles, NTera's RGB display technology determines colors based on each particle's charge. The design uses a 200-dpi passive-matrix transistor array, which is typically slower than active matrix because it updates each row on the screen instead of individual pixels, as active matrix does. However, NTera claims that its technology is fast enough to support video speeds for short intervals. The company says its partners will produce conformable displays early next year for uses such as side displays on cell phones or input tablets. "That is our primary focus," says Alain Briancon, chief technology officer at NTera.

NTera's technology adds another twist: The metal oxide display material is transparent when not charged, laying a foundation for transparent displays. "An overlay on top of a window could be realized," similar to what moviegoers saw in *Minority Report*, says Briancon. But NTera's current products are still built on glass.

Kent Displays Inc. in Kent, Ohio, is developing a bistable LCD based on cholesteric technology. The super-twisted nematic LCDs used today twist constituent liquid-crystal molecules about 270 degrees, says sales and marketing manager Tony Emanuele. Kent's technology twists the molecules 16 or

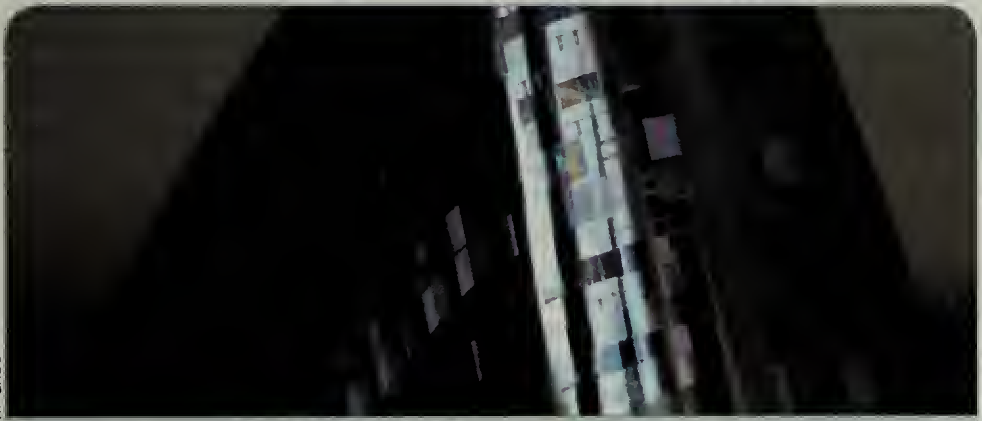
17 times. When twisted that tightly, the molecules don't readily unwind, making the display bistable.

In the lab, Kent has demonstrated its technology deployed on plastic, paper and even fabric substrates. "The chemical recipe for cholesteric lends itself more readily to plastic substrates," Emanuele says, because it has 1/1,000th the barrier requirement of standard LCDs.

Kent's current displays use a relatively slow passive matrix and are best suited for applications such as e-books and signage. The technology includes two-color combinations of either yellow/black or blue/white. Early units are fairly small, at 2.5 by 1.5 in., and offer 100-dpi resolution. Kent is working on a faster, active-matrix display and expects to be able to manufacture its passive-matrix version on flexible substrates by year's end. "Two to three years from now, flexible displays on plastic will be commonplace," Emanuele predicts.

In addition to the technical challenges, flexible displays face several other hurdles before they can become commercially viable. "Making [displays] on glass is hard enough," says iSuppli's Allen. Jet printing requires an entirely different, if potentially cheaper, manufacturing process that is still in the early stages of development. Until volume production is possible, jet-printed displays will be expensive relative to alternative technologies. For example, in the e-paper market, simple paper shelf labels and signage can't be updated electronically, but they're far cheaper, Allen says.

The key, says Jeremy Burroughes, CTO at Cambridge Display Technology Ltd. in Cambridgeshire, England, is to find a profitable niche for early designs. "The hurdle is always to find early areas to get into first," he says, " and gradually build up the knowledge and revenue profile to go into more advanced areas." ▸



HP LABS

The Economies of Printed Electronics

Roll-to-roll printing of circuits across polymer sheets (above) could turn today's fabrication facilities into printing presses for some types of products. While the printing process requires strict tolerances, it doesn't require a cleanroom to produce semiconductors, says Jim Brug at HP Labs.

JET PRINTING enables flexible displays, but what will drive manufacturers toward ink-jet- and polymer-based substrates are the potential manufacturing cost savings, says Jim Brug, imaging materials department manager at HP Laboratories. "One of the big things going on in material science is moving beyond the inorganic thin-film technologies [such as amorphous silicon] to solution-based materials where you can actually spray these things out of an ink jet," he says. Unlike inorganic substances like amorphous silicon, organic semiconductor materials can be applied in liquid form.

HP Labs has developed an ink-jet printing and lamination process that could replace the vacuum deposition and photolithography techniques used to make today's active-matrix LCDs.

Printing on thin polymer sheets allows for a more efficient, automated process than the discrete manufacturing techniques used to produce individual silicon chips on a production line. Electronics can be printed on continuous polymer sheets, a process called roll-to-roll printing.

"These are primarily issues of cost," says Bob Street, senior research fellow at Palo Alto Research Center. "The idea is one can use printing presses rather than silicon fabs to make these devices."

"Printing a display using roll-to-roll processing will allow it to be a very low cost, even disposable type display," says Brug.

HP Labs is researching two processes: ink jetting and imprint lithography, where fine circuit patterns are pressed onto a plastic substrate. Xerox Corp. is working on processes for both polymers and stainless-steel foil substrates.

"This world of digital fabrication will open up very low-cost manufacturing plants that don't cost an arm and a leg to build. Does that mean you don't need cleanrooms? That's right," says Brug.

While the potential manufacturing economies are large, don't expect to run down to your local Staples to purchase organic ink cartridges and polymer sheets for printing electronics on your ink-jet printer. "We're not going to be making displays on our desks anytime soon," Brug says.

– ROBERT L. MITCHELL

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ANDREA WICKLUND

Business on the Map

By Kym Gilhooly

Mind-mapping tools make inroads into corporate IT as they streamline problem-solving and help **structure tasks**.

WHEN BRISTOW Helicopters Ltd. started losing market share in the 1990s, executives moved to improve business processes across the Redhill, England-based company. "We needed to change facilities and maintenance processes, improve the efficiencies of the staff, improve the interface between sales and clients," says John Cloggie, technical director at the European business unit of Houston-based Bristow Group Inc., which provides helicopter services to the oil and gas industry.

A key goal of this re-engineering effort was to cut several million dollars from Bristow Helicopters' operating budget. The company managed the project using MindGenius, "mind-mapping" software from East Kilbride, Scotland-based Gael Ltd. The product enabled it to conduct a SWOT analysis (an assessment of its strengths, weaknesses, opportunities and threats) and carve out various process re-engineering tasks and delegate them to appropriate groups. Each team then took the high-level version of the map and created its own subcategories, tasks and deadlines for its designated work segment. Since beginning the project in 2004, says Cloggie, the company has managed to cut $6 million from its operating budget.

"Mind mapping, of course, didn't directly create our $6 million savings, but it did allow us to control the project while it was being delivered," he says. "The speed with which you can map processes and capture knowledge is a huge return."

Mind mapping has been around for centuries, but it didn't garner much attention until psychologist Tony Buzan began to promote information visualization techniques in the 1970s. A mind map is a diagram that radially arranges words and images around a central theme. It's based on the cognitive theory that many people more easily learn and recall information through graphical representations. Mind mapping — increasingly called business mapping as it makes inroads into corporate settings — is used for a range of problem-solving and brainstorming activities, including managing projects, mapping business processes, creating workflows, planning events and programming software.

Though people can create mind maps using pen and paper, they're increasingly using software that streamlines map creation. These tools let users choose among map templates designed for specific tasks, enter a central topic, and then brainstorm and enter relevant information, such as tasks, timelines and people involved. Each segment can have any number of subcategories, which can result in extremely comprehensive, multilayered maps. However, those sections can also be "scoped" to provide just the detailed view a user needs.

To make maps memorable, users can add color, icons and images. And to make them relevant, they can embed hyperlinks to URLs, connect to news services and attach files such as spreadsheets, audio and video. The map becomes a knowledge base for a particular project, business process or event. Maps, in turn, can be converted into other presentation formats, such as Microsoft Word or PowerPoint files.

Typically categorized as a productivity application, mind mapping represents a small market, says Nikos Drakos, a Gartner Inc. analyst. San Francisco-based Mindjet Corp. is considered the largest of the mind-mapping vendors, earning about $30 million in 2005. One reason for the market's small size, Drakos says, is that the packages aren't available from large, mainstream vendors, so they don't get the exposure that they might as part of larger offerings. Also, users are accustomed to the linear presentation of, say, Word documents and are slow to try new technologies. And mind-mapping tools, like many productivity applications, are currently desktop products, so they don't yet allow for simultaneous collaboration or data-level integration with back-office applications that might inform map-managed projects.

However, says Drakos, as the world becomes more electronically collaborative, mind mapping is positioned to break out. "The story starts with personal productivity, but with the move toward online collaboration and co-creation, it's a story that's about to get much more interesting," he says.

Expanding Applications

Indeed, mind mapping has already moved beyond its roots as an authoring tool to a level where groups create content collaboratively, says Mark Levitt, an IDC analyst. The next iteration, he says, "is making this available online, either for real-time access for participating collaboratively or after the fact, by e-mailing [or] posting on a Web site or in a shared file system."

Activity on a number of fronts is generating interest. Open-source mind-mapping software available through the FreeMind project is doing its part to "prime the market," says Drakos. Mindjet has partnered with WebEx Communications Inc. to bring business mapping to online meetings, as well as with Salesforce.com Inc. to enable salespeople to create visual dashboards for viewing CRM data; it also just released a Macintosh version of its MindManager tool. In addition, vendors are working on server-based products and exploring on-demand options.

At Bristow Helicopters, mind mapping is used for "virtually all business-strategy projects," says Cloggie. Bristow has also used MindGenius for managing employee-retention efforts, and the company always uses it when introducing new aircraft types.

"We have a [mind map] template that's 90% usable for any aircraft type. It's not just a checklist; it's a tool to help the engineer understand the processes by which he'll bring the aircraft in," says Cloggie. "Through it, he understands the interface with manufacturing, among different departments within the company, and with the Civil Aviation Authority."

Educators have been early evangelists of mind mapping, particularly in the U.K. At Giles Brook Combined School in Milton Keynes, England, teachers use BrainMine from Neural Matters Ltd in several ways, says headmaster Philip Scull. One is to test children's grasp of material in areas such as science and history. A teacher constructs a mind map before teaching a unit to determine what students know in a subject area, and then again after the unit is taught to see what they've learned.

"The great thing about [BrainMine] is that you can brainstorm ideas, then rearrange them as they make sense," says Scull. "If you're designing an exam, you can isolate the most important details and revise them as needed."

The real strength of mind-mapping software, says Drakos, is not in its ability to quickly organize large amounts of information in meaningful ways, but in the ability to subsequently revise and reorganize that information.

Users can cluster ideas, move those clusters whenever and wherever they make sense, and embed files from outside the program. "Once you have a structure with a couple of hundred nodes, you can restructure as needed; you can't really do that with other kinds of tools," Drakos says.

Todd Becker, a staff scientist heading the delivery systems group at Palo Alto, Calif.-based Genencor International Inc., agrees that mapping's revision capabilities are a strength. "We like the fact that you can continually change and modify [maps]," says Becker. "When you're working on a project or knowledge base or an interface, your conceptualizing is always changing — the categories you start with usually aren't the ones you stick with."

Genencor, a biotech company focusing on industrial biochemicals, started using Mindjet's MindManager in a knowledge management collaboration between R&D and business development. It soon expanded into IT, manufacturing, marketing and sales, for use in project planning, database organization, meetings and more. The IT group uses MindManager for annual project planning and to justify expenditure requests to executives. Meanwhile, in one case, manufacturing used it to build a database that tracks production forecasts, standard costs and products.

"This spread like fire throughout the company. We actually use maps on our [Lotus] Notes database as entry points to portals," Becker says.

As key business strategies are developed around mind maps, the technology will need to move beyond its status as a desktop product to better facilitate collaboration, say users. In fact, Cloggie was recently invited, along with other mind-map software users from various industries, to speak on this need before the Scottish Parliament.

"We talked about the need to take [mind maps] from being a personal tool to a cross-departmental business tool; you can't extract their true, cross-business abilities if you can't work on maps simultaneously," says Cloggie. "[With real-time collaboration], you can have experts develop templates and facilitators work with different teams to create maps, with the business as a whole sharing them." ▸

Gilhooly is a freelance writer in Falmouth, Maine. You can reach her at kymg@maine.rr.com.

A View for Collaboration

MANAGING A LARGE GROUP of scientists, jokes Milton Smith, can be like "corralling cats." That's particularly so if the scientists whose work you're overseeing are based in medical schools and private- and public-sector labs scattered throughout the U.S. and Canada. The organizations Smith is working with make up the Advanced Medical Countermeasures Consortium, a group developing a drug-delivery therapy to serve as a first-response stabilizer for people exposed to avian flu H5N1, anthrax or mustard gas. To organize and delegate the research that's being conducted, Smith and his partners use Mindjet's MindManager.

While research on the therapy has received some federal funding, thus far the consortium has gotten no backing from private drug companies. "By using universities, we had a low-cost method of doing research and development, but we had to manage a complex task involving many components," says Smith. Smith is a physician and president of Paw Paw, Mich.-based Amaox Ltd., a biotech company established in 1992 to study the therapeutic benefits of liposomes and that now acts as a bridge between government agencies and universities for the consortium effort.

"The only way I could manage all these collaborators and the components they were working on was to use mind mapping," he says.

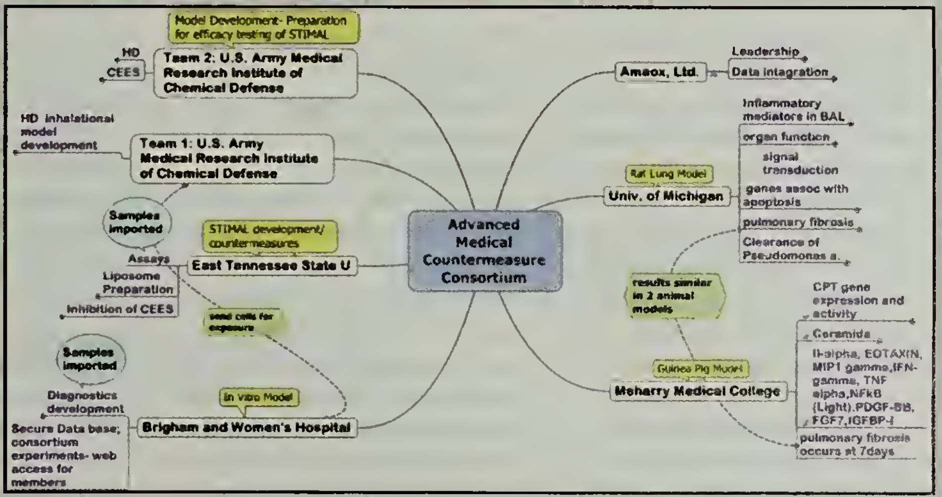
In addition to Amaox, collaborators working on the STIMAL (signal transduction inhibition antioxidant liposomes) drug-delivery therapy include the U.S. Army Medical Research Institute of Chemical Defense, Harvard Medical School, Meharry Medical College, the University of Michigan, East Tennessee State University, Drexel University, Northern Ontario School of Medicine and AFG Biosolutions Inc. The maps detail which institution is working on which aspect of the STIMAL project, timelines for research, and results.

Using the maps to manage the aspects of the project related to mustard gas, for example, Smith and crew can simultaneously review the results of the University of Michigan's animal-tested inhalation model and East Tennessee State's in vitro tests on cells. Capturing results with MindManager, says Smith, allows his team to review the tests from a high-level view and develop a systemic understanding of the problem.

"It's much easier for everyone to visually scan [efforts and results] rather than plow through long reports," says Smith. "Linear tools don't really capture relationships the way mapping does."

– KYM GILHOOLY

One of the mind maps used by the AMCC to organize a research project.


Model Development- Preparation for efficacy testing of STIMAL
HD
CEES
Team 2: U.S. Army Medical Research Institute of Chemical Defense
HD inhalational model development
Team 1: U.S. Army Medical Research Institute of Chemical Defense
Samples imported
STIMAL development/ countermeasures
Assays
East Tennessee State U
Liposome Preparation
Inhibition of CEES
send cells for exposure
Samples imported
Diagnostics development
In Vitro Model
Secure Data base; consortium experiments- web access for members
Brigham and Women's Hospital
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genes assoc with apoptosis
pulmonary fibrosis
Clearance of Pseudomonas a.
results similar in 2 animal models
CPT gene expression and activity
Ceramide
Il-alpha, EOTAXIN, MIP1 gamma,IFN-gamma, TNF alpha,NFkB (Light),PDGF-BB, FGF7,IGFBP-I
Guinea Pig Model
Meharry Medical College
pulmonary fibrosis occurs at 7days

No Rush to Give Russian Engineers Net Access

Our manager is flexible on the matter but has concerns about protecting intellectual property. By Mathias Thurman

I JUST RETURNED from Moscow, where I visited a company we outsource some of our software development to. Outsourcing software development can be a risky business. The theft of my company's source code could hit revenue hard. Now that USB pocket drives and other small, removable media have capacities as high as 5GB, it would be scarily easy for someone to put years' worth of software development on an external drive and walk out the door with it.

SECURITY MANAGER'S JOURNAL

We entered into this outsourcing arrangement a couple of years ago extremely leery about the potential threat to our intellectual property. The truth is, we would have preferred to maintain software code development in the U.S., but our competitors outsource much of their development in the pursuit of lower costs, so we are pretty much forced to do the same just to remain competitive.

The Russian company we engaged put about 30 software engineers on the job of creating software programs for operating the hardware we manufacture. To facilitate the arrangement, we created a VPN tunnel between the office in Moscow and our data center in the U.S. At our end of the tunnel, we configured strict rules that allow those 30 engineers to access only certain source code repositories, e-mail and the other corporate resources they need to do their jobs. Internet access is almost completely restricted. The lone exceptions are for updates to Microsoft Windows and virus signatures. If the engineers want general Internet access, they can use a few kiosks that have been set up in public areas of the office. These kiosks aren't connected to our point-to-point VPN circuit, but to the Russian company's own network instead.

We also mandated the removal of floppy drives and writable CD-ROM drives, and we had the engineers modify the BIOS settings on their machines to disable USB and other external ports.

Our nervousness dissipated as we began to see the quality of the work and the integrity of the engineers. Things were working pretty smoothly until recently, when the engineers started complaining that the lack of Internet access was affecting their productivity. When they wanted to search for common software code modules, troubleshoot problems or collaborate with other software engineers, they had to go to one of the kiosks. So, we've been studying how to give the engineers the Internet access they want while ensuring that intellectual property doesn't leave the company.

Our thinking was that we needed to gauge the trustworthiness of the Russian engineers before we could risk source code exposure as a result of giving them Internet access. As a security professional, it's my job to assume that there is a determined insider looking for a way to steal our intellectual property or conduct some other illicit activity. I also have to assume that we must constantly guard against inadvertent disclosure of our intellectual property. A worm or Trojan horse program designed to compromise a system and the data residing on it could be introduced very easily by a careless engineer with Internet access.

> We needed to gauge the trustworthiness of the Russian engineers before we could risk source-code exposure.

In Russia, I inspected the facility, especially the workstations, to ensure that the original mandates were being followed. I also conducted scans to detect rogue wireless access points and a general penetration test of the Russian company's network. Then I gathered the engineers to tell them why our concerns about our intellectual property meant we had to be cautious before granting their request. I explained that under U.S. law, a company can label information as a trade secret only if it has taken reasonable precautions to protect the data.

Surveillance

Our plan was to monitor the Russian engineers' computers. Over the past few months, we have been piloting Digital Guardian from Waltham, Mass.-based Verdasys Inc. Our initial interest in this product was to surreptitiously monitor employees suspected of criminal or other unauthorized activity. With Digital Guardian on a computer, we receive reports telling us whether the user is doing things like copying sensitive files to CD or USB devices, printing them, FTPing them or e-mailing them via Web mail.

In Russia, though, we advertised our intentions to the group. We explained that after a certain amount of time, we would evaluate the reports and determine whether we would enable Internet access through the VPN tunnel.

Naturally, the engineers had some concerns, though they generally understood our motivation. One worry was that we would report personal, nonbusiness-related activity to their managers; I assured them that wouldn't happen. Another was that we were singling them out by applying restrictions that aren't imposed on other vendors; I told them that we apply the same mandates to all of our outsourcing partners that have Internet access. Perhaps their greatest concern was the lack of any policy guidelines on what they can and can't do with our source code. They were afraid that activities that they thought of as innocent could be a reason for termination in the company's eyes. Since that is a valid concern, I have given myself an action item to complete a policy that spells out the types of activities that won't be allowed once Internet access is granted.

We have answered a reasonable request with a reasonable response, and we have explained why we are taking actions that we think are necessary but could offend someone who doesn't understand the reasoning. Offshoring high-value business remains a challenge for us. All we can hope for is that by putting reasonable controls in place, we can properly protect our intellectual property from inadvertent disclosure and cause a potential thief to think twice before sending source code to a competitor. ▸

WHAT DO YOU THINK?

This week's journal is written by a real security manager, "Mathias Thurman," whose name and employer have been disguised for obvious reasons. Contact him at mathias_thurman@yahoo.com, or join the discussions in our security blogs: **computerworld.com/blogs/security**

To find a complete archive of our Security Manager's Journals, go online to **computerworld.com/secjournal**

SECURITY LOG

Data Exposed on Opposite Coasts . . .

The Social Security numbers of more than 600 high school students in Catawba County, N.C., were found on the Internet by someone conducting an unrelated Google search. The page has been removed from the school system's Web site, and Google Inc. is taking steps to remove the page. Meanwhile, a laptop containing Social Security numbers and other data belonging to nearly 3,000 current and former San Francisco State University students was stolen from the car of an SFSU faculty member. A university representative said it is "very common" for faculty to have student data on their computers. Both schools said they stopped using Social Security numbers as identifiers before the breaches occurred.

. . . And the Other Side of the World

A police officer at the Australian High Tech Crime Centre lost a memory stick containing sensitive financial data belonging to thousands of Australians, according to *The Australian* newspaper. The device holds a dossier on Russian phishing scams. The officer who lost the memory stick violated several rules regarding data transport. Several banks whose customers' data was on the stick wanted to contact customers but were persuaded by the center not to, so as not to alert criminals.

Exploit Released

Microsoft Corp. said exploit code for a critical flaw in Windows Routing and Remote Access service has been released. Computers without a patch that was issued June 13 (MS06-025) are vulnerable to the exploit.

Backup Strategies

DEFINITION

Backup strategies take many different forms, depending on exactly what is backed up (and when, and to where), whether the technology uses compression, how far apart copies are made and other factors.

QUICK STUDY

BY RUSSELL KAY

EVERY IT manager knows the critical importance of regularly backing up computer systems and data . . . and of being able to restore any or all of them in the event of a system outage, hardware failure, natural disaster or other data loss.

For a long time, daily backups were usually done by writing copies of files to magnetic tape. This was typically an overnight batch job that ran when no other regular production work was scheduled. Periodically — perhaps once a week — a full or complete backup of all data and systems would be made.

In a technique called data reduction backup, files were typically made smaller through some form of lossless compression, such as Zip files, before being written to tape. A related option, called a mirror backup, skips the compression step and writes to another disk, allowing backup files to be read and managed using normal system tools.

But the amount of data that organizations use and store has grown rapidly, and with this comes the need to keep systems running for longer periods of time (up to and including around the clock).

Given the ever-decreasing available times during which backup could be done (known as the backup window) and the increasing length of time required to actually perform that backup, corporate IT found itself caught in a bind: It couldn't guarantee to keep the system running unless it had up-to-date backups, but neither could it shut the system down, even partially, so that it could actually do those backups.

Partial Backups

A number of strategies have been developed to resolve this dilemma. The first is partial backups. These depend on the existence of full backups made at regular intervals, and the idea is to save time by backing up only those files that have been changed, knowing that you already have a backup of the other, unchanged files.

To determine which files have changed, the backup software looks at the modification date and time of every file on the system, and if a file's time stamp is later than the last full backup, that file is included in the next differential backup. To restore files, whether individually or the complete system, you have to first restore the latest full backup and then the latest differential backup. Obviously, this type of restore operation is slightly more complicated than one from just a full backup.

But as the number and size of high-activity files keep growing, these differential backups can take nearly as long to complete as a full backup, which is much easier and simpler to restore. So someone got the idea of backing up only those files that had changed since the last differential backup.

This three-step scheme is called incremental backup, and yes, it does reduce the amount of data that has to be backed up. It seems a pretty good trade-off until you actually have to restore something. You first restore the most recent full backup — so far so good — and then restore the latest differential backup; finally, you restore every one of the intervening incrementals since that differential. All this is necessary to make sure that all files are current to the last backup.

Here's a quick example. Say a full backup was done on Saturday and the system crashed the following Friday, with differential backups made on each intervening day. After restoring the full backup, you would then have to restore, in chronological order, the backups from Sunday, Monday, Tuesday, Wednesday, Thursday and Friday. Whew!

In addition to the time needed to make all those restores, just the effort in mounting and remounting all those tapes would be significant. Automated hardware, including tape cartridge libraries and jukeboxes, can help out some with this process, but a differential restore is not a trivial event, especially if your systems are large enough that the full backups are done less often than weekly.

Incremental and differential backups can be combined so that the incremental copy includes all changes made since the last full or differential backup. This requires even more careful record-keeping and tape inventory, but it can make for somewhat faster, if more complex, restores.

Continuous Backup

Another problem with those older backup schemes is that they aren't well suited to transactional and real-time database-driven systems, where it is essential to back up every stage of every transaction, file change, disk write or I/O operation. So far, the best response to this need appears to be continuous data protection.

With CDP, also called continuous or time-based backup, you automatically capture, on disk in a separate location, every version of data that a user saves. With this technique, you can restore data to any given point in time, up to and including the last saved disk write and I/O operation prior to a failure.

An important factor that differentiates CDP from RAID, replication or mirroring is that those techniques only protect against a hardware failure by saving the most recent copy of the data. CDP will also help you recover from data corruption, by letting you find the exact point at which data has become corrupted.

One issue is granularity: How big a chunk of data do you save for each type of application? The whole file, or just the changes? Complete mailboxes, or individual e-mail messages? Database files and indexes, or transaction logs? Most CDP products save just the changed byte or disk block, not the entire file. Change one byte of a 10GB file, and CDP backs up only the changed byte or block. Traditional incremental and differential backups copy the entire files. Thus, CDP frequently needs less space on backup media.

Snapshots

A somewhat different approach that isn't considered full CDP uses a snapshot methodology, recording complete system states at regular intervals (potentially as often as every few minutes). Snapshots rely heavily on pointers to the original volume, which must be intact.

Snapshots can usually be created quickly, and they can be used to restore or re-create point-of-time disk states. But snapshots are not backups, and they must themselves be backed up if they are to support any recovery from disk crashes or other physical failure. ▶

Backup Strategies Compared

BACKUP SCHEME	TYPICAL MEDIUM	ALL OR SOME DATA?	DATA COMPRESSED?	MAJOR ADVANTAGE
Full backup	Tape	All	Yes	Simple
Differential	Tape	Some	Yes	Saves time
Incremental	Tape	Some	Yes	Very fast
Mirror	Disk	All	No	Simple, fast
Snapshots	Disk	Some	No	Very fast
Continuous	Disk	Some	No	Efficient media use

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BRIEFS

SPI Unveils Security Analysis Apps

- Atlanta-based SPI Dynamics Inc. last week released two high-speed security analysis products. WebInspect 6.0 examines Web applications using SPI's Intelligent Engine technology, while DevInspect 2005 combines source-code scanning and black-box testing in a process called hybrid analysis. Both dramatically reduce false-positive responses to security scans, says SPI. Licenses start at $6,000 and $3,700, respectively.

ECopy Builds on Scanning Suite

- Nashua, N.H.-based eCopy Inc. recently released two additions to its document scanning and distribution suite. ECopy Desktop 9.0 allows users to modify and manage PDF documents in much the same way they work with paper documents, while eCopy ShareScan OP 4.0 is a secure scanning and e-document-sharing program, according to eCopy. ShareScan OP 4.0 starts at $2,995 per device.

Antepo Adds IM, VoIP Capabilities

- The latest version of Antepo Inc.'s Open Presence Network communications application, called Rivoli, brings together presence awareness with instant messaging and VoIP capabilities, according to the New York-based company. The beta version of Rivoli is available now at no charge; the final version is due in August starting at $36 per user.

HiSoftware Rolls Out Site Monitoring Tool

- HiSoftware, a Nashua, N.H.-based developer of Web content governance software, has released the AccMonitor Site Quality Module. The product automatically tracks server response time, reports broken links and imagery, and identifies other critical issues that could detract from a user's experience, the company says. Pricing starts at $25,000.

MARK WILLOUGHBY

Economics, Not Innovation, Drives H-1B Debate

ECONOMICS is driving the IT industry to doggedly persist in efforts to secure a big boost in H-1B visas for foreign workers this year, despite the move by a divided Congress on June 20 to table the controversial issue and seek voter input.

So far, large IT corporations have dictated the H-1B debate. The IT industry's lobbyists worked overtime to engineer a compromise between the Senate and the House to boost H-1B visas for their large corporate benefactors, whom CNN's Lou Dobbs dubs "corporate supremacists."

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In the deal, the IT companies wanted the Senate to drop its support for a bracero guest-worker program for poor Mexican *campesinos.* In return, the House would agree to increase H-1B visas for skilled foreign workers from 65,000 to more than 115,000, with regular yearly increases baked in.

The IT corporate lobbyists — the Semiconductor Industry Association, the Information Technology Industry Council, the Information Technology Association of America, the AEA and others — are again twisting arms in the House, where immigration is as popular as lobbyist Jack Abramoff, in an attempt to pass the H-1B visa increase.

Maybe immigration hearings away from all the miasma raised by cash changing hands inside the Beltway would give citizens and IT workers a chance to be heard. We can hope that the H-1B issue isn't overshadowed by the debate about amnesty for 12 million illegal immigrants or finessed by corporate lobbyists in smoke-filled rooms.

IT lobbyists have tried, mostly in vain, to make the ideologues in the House understand the innovation argument for H-1B visas. In a fairly traditional tactic, almost a dozen members of Congress and one senator were flown to India on an all-expenses-paid junket in 2004.

The House members were unmoved, but not the representative of the upper chamber. The lone senator on that 2004 India junket, Texas Republican John Cornyn, has joined the advocates of the H-1B visa increase and is sponsoring the so-called SKIL (Securing Knowledge, Innovation and Leadership) Act of 2006 with Sens. George Allen (R-Va.), Wayne Allard (R-Colo.), Robert Bennett (R-Utah), Michael Enzi (R-Wyo.) and Trent Lott (R-Miss.).

According to the Center for Responsive Politics, Cornyn has pocketed more than $145,000 in contributions from IT corporations since 2000, including $13,818 for the Indian trip. The other sponsors have also accepted generous high-tech contributions.

The large IT corporations repeat the mantra that the U.S. needs these skilled foreign workers to innovate in order to remain competitive. That is a specious argument. Innovation by large IT corporations is usually of the incremental kind, adding new features to established products to protect profits. Remember how Microsoft innovated Netscape out of existence?

When large IT corporations need disruptive technologies to create or enter new markets, they usually acquire an innovative small company. Most seminal technical innovation in the U.S. is in entrepreneurial small companies, not in risk-adverse IT corporations. Microsoft has acquired many innovative companies over the past 18 months to enter new markets, a half-dozen in message hygiene alone.

The real argument, rarely made by IT corporations, for increasing H-1B visas is simple economics. H-1B workers are a new type of indentured servant. In a new, unfamiliar country, they are docile and focus on working hard. The H-1B sponsorship provisions make it very difficult for H-1B foreign workers to change jobs.

Large numbers of productive H-1B workers save millions in human resources and R&D costs, boosting the value of their employers' stock. The economic argument makes IT corporations sound greedy. The innovation argument plays better on Main Street.

The most reasoned discussion of the complex and impassioned H-1B visa issue comes from the venerable Institute of Electrical and Electronics Engineers (*www.ieeeusa.org/policy/issues/H1bvisa/index.html*). It asks, What about declining enrollments in domestic computer science curricula, rampant abuses in the H-1B program, the lack of enforcement of H-1B prevailing-wage requirements and retraining the many unemployed engineers in the U.S.?

The IEEE makes another H-1B proposal you never hear from the large IT companies and their lobbyists: Why not offer permanent immigration status to skilled foreign technology workers when there is a proven shortage of engineers or programmers? Foreign workers with permanent immigration status would be freed of constraints on job mobility, which the large technology companies in no way favor.

The last H-1B issue you rarely hear discussed is an emotional IT workforce organizing and replaying the rise of unions in the steel and automotive industries. If IT workers start to organize, the jobs will move offshore for sure. ▸

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MANAGEMENT

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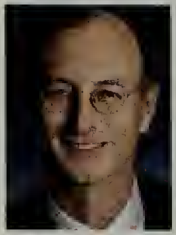

Q&A

Workforce Crisis

If you don't believe an IT talent crunch is coming, author Robert Morison will convince you. He offers some creative ways to prepare. Also, read an excerpt from his new book on the subject. **PAGE 34**

IT MENTOR

Acing the Interview

There's much more to a successful job interview than getting an offer. David Christiansen shares a strategy for finding out whether you really want to work there after all. **PAGE 36**

OPINION

The Technical Siren's Call Isn't Easy to Ignore

An IT manager's desire to revisit hands-on work is as powerful as it is common. Paul Glen tells you why and offers tips to help you avoid leading your team straight onto the rocks. **PAGE 37**

When Your OUTSOURCER Is ACQUIRED

How to prepare for, minimize and deal with the pain. **BY MARY BRANDEL**

KEVIN SMITH, information systems director at Spyder Active Sports, knows how hard the transition can be when an outsourcer is acquired.

RAY NG

IF YOU ASKED Kevin Smith three years ago what it's like to have your outsourcer acquired by another company, he might have said, "No problem." Today, however, he's got a different tale to tell. That's because Smith, information systems director at Spyder Active Sports Inc. in Boulder, Colo., has had the experience not once, but twice. And while the first transition couldn't have gone more smoothly, the second ended in disarray.

It all started six years ago, when the outerwear designer and manufacturer outsourced its J.D. Edwards ERP system to application service provider (ASP) Prentice Technologies Inc. Three years later, when Prentice was bought by Fortrust Solutions, a data center management firm that wanted to move into the ASP arena, the handoff went fine. "It was all well managed," Smith says.

Then, in mid-2004, Fortrust sold its ASP business to a software-as-a-service provider in California. The transition itself went smoothly enough, but over the next year and a half, service levels dropped off, and gradually, nearly all the original Fortrust staffers left the firm, Smith says.

"Several times, I asked their management, 'Are you guys serious about this line of business? Because it doesn't appear that way to me,' " he says. "On several occasions, I even offered to pay more for better service, but they never took me up on it."

With his contract up for renewal, Smith began looking for alternatives. This year, he signed on with a new outsourcer, OneNeck IT Services Corp. in Scottsdale, Ariz., with which he is currently satisfied.

Smith's dual experiences contain valuable lessons for outsourcing customers, given the consolidation activity in this arena. Outsourcers are eating up other outsourcers to increase scalability, expand global presence, take advantage of lower-cost skills and broaden service offerings, experts say.

"With increasing regulatory pressures, demand for encryption, fears of identity theft and the need for privacy, it's getting harder and harder to be a small service provider," says Dan Scheuble, president of the mortgage division at Fidelity National Information Services Inc., a provider of information products and outsourcing services in Jacksonville, Fla. Larger providers can leverage their investments across all of their product offerings, he explains.

And the mergers aren't just domestic. IBM, Electronic Data Systems Corp. and Accenture Ltd. have acquired, partnered with or made moves to buy Indian outsourcers. And India-based companies like Wipro Ltd., Tata Consultancy Services Ltd. and Mastek Ltd. have bought service firms in other parts of the world.

"The race is on, and the goal is more efficient global delivery," says Paul Roehrig, an analyst at Forrester Research Inc. in Cambridge, Mass.

Here's what you can do now and later to minimize the pain that can occur when your outsourcer is acquired.

PLAY DETECTIVE

As soon as you hear rumblings that your provider is on the block, it's important to dig up as much information as you can about potential buyers.

"What customers want to hear is whether the acquirer will continue to grow the product or just wants the cash flow," Scheuble says. "They want to hear the business strategy."

This can be difficult if your provider can't or won't tell you who the potential buyers are. That's what happened to Maria Richards, director of IT at Trex Co., a manufacturer of alternative decking materials in Winchester, Va.

In 2003, Richards knew that the ASP that Trex used for its ERP system was for sale, but she felt pretty secure, knowing her contract contained several protections. For instance, her provider was required to give her advance notice of a sale, and Trex could opt out of the contract in the event of an acquisition.

Richards had also stipulated that Trex's application run independently of other systems so it could be extricated if she transitioned to another provider. Finally, she had arranged a depreciation schedule for the equipment that hosted the application in case Trex needed to buy it back.

But there was one thing Richards didn't bargain on: the difficulty of doing due diligence on the buyer when you don't know who it is. "We knew they had three [companies] looking at them, but we didn't know who they were," she says. "And there was nothing in the contract that said they had to tell us."

As a result, when the buyer was announced, there was a scramble to determine whether Trex would transfer the contract or find a new provider.

"We had to get out to their data center very quickly, hold meetings with their executives and people working on our account, check out their business plan and financials, check references — all in a tight period of time," she says. "I would have rather had it spread out."

"It's terrible when you don't know who the acquirer will be," agrees Scheuble. "I'd be trying to figure out the likely buyer and creating contingency plans based on what I know."

TALK EARLY, TALK OFTEN

An outsourcer acquisition brings FUD: fear, uncertainty and doubt. Customers may wonder whether to stick with the buyer or move to a new provider and just where they fit in the new provider's strategy.

"The level of fear and uncertainty is a huge issue," Roehrig says, "and a competitive differentiator is how the vendor manages that change."

To clarify the situation, the two parties need to talk early and often. Customers should expect open communication, visibility into strategy and financials, clear deliverables and a project plan to manage change, he says.

A common fear is that service levels won't continue to be satisfactory. But for the most part, Roehrig says, it's in the acquirer's best interest to maintain them in order to avoid breach of the contract. "The goal is to keep the customer and expand the delivery footprint," he says.

Scheuble agrees. When an acquisition occurs, "everybody's at risk," he says, "so it's important to get on the same page and identify the big issues early on. There's always a way to modify the contract so that everyone gets something they want."

The discussions should continue as the transition unfolds. At Trex, a big issue was getting a clear view of the new provider's policies and procedures, which were more formal than the previous ASP's. "They have a much more tightly defined and well-documented way of doing problem resolution and taking requests," Richards says. "There was a period of uncertainty where we had to get used to that."

As it turns out, the extra documentation is a benefit to Trex, because it helps smooth its auditing process — a big concern, since Trex is subject to regulations such as the Sarbanes-Oxley Act.

REIN IN THE STAFF

During an acquisition, another important issue is whether you'll be able to continue working with the staffers you've become familiar with and who have become knowledgeable about your company's needs. The good news is that in many cases, staff members get absorbed into the new entity. The bad news, however, is that the biggest changes often occur at the top of the organization, Roehrig points out. "If you're used to dealing with senior levels of the organization, you're going to have to meet new people," he says.

Smith had to get used to less-personal service when he moved from Fortrust to his new provider. With Fortrust, when there was a problem, he was accustomed to calling someone he knew by name, but with the new outsourcer, he was instructed to use an anonymous trouble-ticket system. "You ended up with a person whose capabilities you didn't know," he says. "It became more generic."

Trex was assigned a new customer manager to drive the transition, but its contract terms stated that it had to be notified in writing when there was a change in staff, which might give the outsourcer pause before making a staffing shift. "We wanted to make sure the people familiar with our environment stayed," Richards says.

Smith suggests building in a contract clause that specifies retention periods for staffers working with your application, with reduced contract payments if staffers leave sooner. "Service levels do change when people leave," he says. "Even if you end up with a better person, they still have to come up to speed."

MANAGE THE MOVE

Some acquisitions entail a move to a new data center, which everyone agrees is disruptive. For instance, when two major automated teller machine service providers — Concord EFS Inc. and Star Systems Inc. -- merged and consolidated data centers in 2001, "it threw a wrench into our development plans," says John Dick, CIO at Regions Financial Corp. in Birmingham, Ala.

The bank wasn't involved with the heavy lifting, but it did have to do extensive end-user testing, which meant pushing other strategic projects to the back burner. The conversion also required negotiating over who paid for what and whether the bank would be compensated for its extra efforts.

"It was like any big conversion, ex-

[? FIGHT OR FLIGHT]

Many contracts include "change of control" provisions that release customers if an acquisition occurs. The question is whether to move away from the original provider. While some conditions are untenable – like a defense contractor working with a U.S.-based outsourcer that gets acquired by an Indian firm – it's often more beneficial to make the transition, says A.B. Maynard, president of Agilocity Consulting in Berwyn, Pa.

"From a contract perspective, you want maximum flexibility," he says. "But you have to look at what you want to do from a practical standpoint."

For instance, there's often a fee involved for contract termination, even when change-of-control provisions exist, and switching suppliers can cause months of business disruption, says Paul Roehrig, an analyst at Forrester Research.

If you decide to walk away, it's likely that the vendor will help you with the handoff, says Dan Scheuble, president of the mortgage division at Fidelity National Information Services. "The market is small and getting smaller, so it's to the provider's benefit to make the conversion very smooth," he says. "Half a dozen times, we've seen customers circle back to us, and they remember we took care of them."

– MARY BRANDEL

Preempting Problems

When should you start worrying about your outsourcer being acquired? When you draw up the initial contract. Here are some suggestions for heading off acquisition woes at deal-signing time.

Advance Notice of a Sale

Stipulate that the customer must get advance notice of the outsourcer's acquisition or merger plans, says Neil Hirshman, a partner at Kirkland & Ellis LLP in Chicago. This gives your company time to perform due diligence on the buyer or to review other options, such as insourcing, choosing another provider or negotiating for contract modifications.

Exit Provisions

This is the best time to think about how you're going to end the deal, Hirshman says. "The pain one feels transitioning into these arrangements is the same as one feels getting out of them," he says. Establish how you will extricate all the things you need, including tangible assets, software licensing agreements, employee knowledge and data – especially if you need it in a particular format.

Knowledge transfer is a huge challenge, Hirshman says, because a lot of institutional knowledge is tied up with the outsourcer's employees. "You have to think about what kind of access you need to the provider's employees, for how long, which employees and what kind of documentation has to be put together," he says.

Many contracts have nonsolicitation provisions that prohibit companies from hiring the outsourcer's employees for the length of the deal, he adds, so make sure there are exceptions to those provisions. "There might be certain employees you absolutely need to bring in-house or transfer to the new provider," Hirshman says.

Intellectual Property

Intellectual property rights can become a big issue, Hirshman says, because some outsourcers use proprietary processes. For the customer to continue operating the way it did before, it might be necessary to transfer a license from the old provider to the new one.

"You'd want to negotiate access and license rights in advance, or you might have to transform your processes all over again," he says.

Termination Rights

Include change-of-control rights, which enable the customer to terminate the contract if ownership changes hands. The terms can vary from absolute termination rights to conditional rights, such as those that would come into play if the acquirer were a competitor of yours. Some outsourcers may require a fee upon termination. In that case, ask that the fee be reduced if insufficient notice is given.

– MARY BRANDEL

cept we weren't at the helm of it," Dick says. "We've performed a lot of mergers, so we're used to managing ourselves, but there's a level of confidence you have in yourself that you don't have in a vendor."

Scheuble suggests trying to get the vendor to time the transition to your benefit. For instance, when Spyder moved from its first ASP to Fortrust, the new provider timed the data center move to coincide with an upgrade that Spyder needed anyway, and then it ran the systems in parallel until Spyder was comfortable with the new setup.

"I was dealing with the same people, and even though the hardware had to be moved to their facility, it was well organized, so there were no problems," Smith says.

Richards also endured a data center move from Charlotte, N.C., to Gilbert, Ariz., but the new provider maintained the existing facility for a year and a half.

The most important thing for customers of acquired outsourcers to keep in mind, Scheuble says, is that they have a lot of room to negotiate. "They have more leverage than they think," he says. "If a company just went out and paid a premium for another company, it needs to retain those customers." ◗

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Workforce Crisis

Ready or not, an IT talent crunch is coming. Here's how to prepare.

Like global warming, the reality of the looming talent shortage is pretty well established, but that hasn't induced many IT managers to prepare for it. Now there are no more excuses. Workforce Crisis: How to Beat the Coming Shortage of Skills and Talent *(Harvard Business School Press, 2006) lays out a comprehensive plan to ensure that your IT organization — or any organization — continues to recruit and retain workers with the skills and commitment to move forward.* **Robert Morison**, *who wrote the book with Ken Dychtwald and Tamara J. Erickson, spoke with Kathleen Melymuka about the challenges for the coming decade.*

The talent shortage is hard to get too worried about when you're not feeling the pain. When will this problem really become apparent? Any business that is already in an industry that relies on occupations in short supply knows about this. That's not computer science yet, but engineering disciplines, oil and gas, health care — especially nursing — public utilities, and government — especially the federal government. I bet their IT workforce has an old profile. And to any organization that dares to take a close look at its workforce demographics and plan ahead, this will resonate.

When will it start to hit? The oldest boomers are 60, and the average retirement age is 63, so I'd say you'll be feeling pressure by 2010 and very much pressure by 2015. We may be a couple million workers shy in 2010 and 10 million shy around 2015. But you're right: In most organizations, this is still seen as an indefinitely postponable issue.

You call older workers the untapped resource. Why? Workers over 55 are the fastest-growing segment of the workforce. Workers over 55 used to be 17% or 18% of the workforce in the '50s and '60s. That segment bottomed out in the '90s at under 11%, but now it's inching up, and by 2015, it will be close to 20%. The average employer will have to rely more on workers over 55.

And there are two additional things going on with IT. One is the rather disturbing trend of the declining number of computer science undergraduate majors and graduate enrollment between 2000 and 2005. The other is that a lot of IT organizations have a generation gap. There's a group of really mature workers in leadership and a group of very young workers who have really different experience and attitudes toward the technology itself, having grown up digital.

But how will employers be able to rely more on workers over 55? Won't they be retiring? The good news is that the boomers should play a role in the brain-drain solution as well as in the problem. Seventy-five percent are on record — repeatedly, in many surveys, including ours — as saying that they intend to keep working at least part time in retirement. One-third of these cite financial reasons — they haven't accumulated enough wealth and pension to retire completely. The other two-thirds say [it's] because they want to remain active.

The trick is that they generally don't want the same responsibilities or intensity, and many don't want to work for their old employers. Most want very flexible schedules. The most popular pattern is not reduced hours or regular part-time, but rather larger chunks — even six months — of time on and off. So employers can keep a lot of experience and brain power available if they meet working retirees on their own terms. Few employers are ready to handle such flexibility, but they should start practicing soon. IT has an advantage in that much of its work is already structured as projects of specific duration, so a person can sign on for a project at a time.

Can you suggest any strategies for using mature workers to best advantage? If you haven't done so already, start a "retiree return" program with specific procedures for how retirees remain in affiliation — and available for part-time work — with the company.

Hire other companies' retirees for similar part-time work. They do not know your organization, so you lose continuity and institutional knowledge, but they may bring valuable skills and experience. And if their health care is already covered through their retiree benefits, they can be very cost-effective.

Remember that the mature employees whom you really want to retain are engaged by the same factors now as earlier in their careers: interesting and meaningful work, a congenial workplace, opportunities to learn new things and grow personally, and the chance to work with a variety of colleagues, including much younger ones. Don't use them as filler or in repetitive roles that don't leverage all that they have to offer. If you do, they'll be lessening the brain drain for your competitors.

At the midcareer level, you talk about "the boomer bottleneck." What's that, and how does it affect productivity? Our research included a nationwide worker survey conducted by Harris [Interactive]. It found that midcareer people — from ages 35 to 54 — work the most hours and are the least satisfied on the job. According to a Conference Board study, overall job satisfaction declined from 1995 to 2005, and it declined most among those in midcareer. They are most likely to say they feel dead-ended — more than 35%.

BARELY ON THE RADAR

Do you have any plans in place to retain baby boomers beyond normal retirement?

Part-time opportunities	7%
Consulting opportunities	13%
Mentoring opportunities	4%
All of the above	15%
None of the above	61%

Base: 110 attendees at *Computerworld*'s Premier 100 IT Leaders Conference, March 2006

What happens is that there are changing family patterns: Parents are living longer and families are being formed later, so a lot of midcareer workers have young children at home and are responsible for caring for elderly parents. A lot find their responsibilities at home, in the community and on the job are at all-time highs — all at the same time.

Meanwhile, a lot of them have had careers interrupted through mergers and acquisitions, restructuring and downsizing. Others feel they're bottlenecked without as many promotion slots as there used to be, or they feel they haven't accomplished what they had hoped to at this point. And survivors of downsizing are worn out and burned out.

So mix that all together, and it's like the work version of the midlife crisis. That group has the highest correlation of low employee engagement. The effects on productivity are sure to be profound. A lot of people are overdue for a career rekindling — for opportunities to get recharged on the job, for lateral moves and fresh training. If you have just a job-posting system, maybe you need to look beyond that and actively encourage people to move around and spread their wealth of knowledge. Without that, just think how much energy and productivity is left on the table.

Then there's younger worker churn. Is that just the new normal, or is there a way to engage their loyalty? Statistically, people today job-hop more than their parents did at that age. We all know people who have had seven or eight jobs by age 30. Corporations changed the game, and there is no longer a promise of loyalty for security. We've been saying for years that employees own their own careers; young people behave accordingly. They see what happened to their parents' careers and to their health care and pension plans. So they know they're free agents.

So, how do you engage them on their own terms? First, give them the opportunity to have a quick start. Don't ask them to bide their time, earn their stripes. Enable them to feel that work is exciting and meaningful from Day One. If you succeed, you increase the odds of keeping people longer. The second thing is to give them opportunities to learn a lot. Finally, keep in touch with those who leave, and invite them back.

Flexible work arrangements are a big part of your recommendations, but you also talk about flexible compensation and benefits. Why are they important, and how do they work? Most organizations don't have that much flexibility in compensation and benefits. We've heard of a few where people can trade off between total comp and time off, for example, but deals like that are usually one-offs. Benefits tend to be cafeteria plans: You take one from here and one from there.

We find what's needed is more combinations: a flexible schedule and child care support, for example. Most companies say, "Here's the list," not, "What are the combinations that will make the greatest difference to our employees?"

Also, a lot of people are overwhelmed by the complexity of their health care coverage. We recommend that you give people the benefit of accessible benefits. Make them easy to understand.

These ideas are all interesting, but if my workforce seems satisfied, why rock the boat? People may say they're satisfied, but are they really engaged? Satisfaction is, "I could be doing worse." Engagement is to go the extra mile to help this organization. You need to make that distinction between satisfaction and engagement. Are you tapping into their strengths and all they have to offer? ▸

Analyzing Your Workforce Demographics

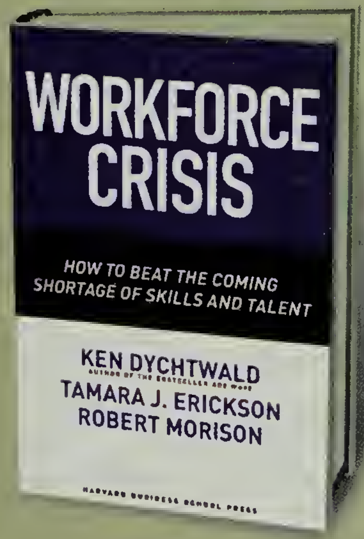
BOOK EXCERPT

Workforce analysis should be an ongoing business process (not an occasional extraordinary effort) to ascertain best actions (both short and long term), to ensure adequate talent supply and to communicate with an organization's leadership in concrete terms what they should know and do about the workforce situation. The process has five basic steps:

Diagnose your business symptoms related to the workforce. Key questions include these: Can your workforce respond in a timely manner to shifting market and business conditions? Are you experiencing high turnover rates – especially in specific professions, functions, roles, or age, gender or ethnic groups? Are you having trouble filling specific openings? Do you have difficulty identifying and effectively deploying talent? Do you know what the right mix of talent would be?

Assess your current workforce characteristics. Determine employee characteristics and preferences, and make this information as "local" as possible – by business unit, geography, function, role and profession. Determine your local age distributions, turnover and employee cost patterns. Try to understand not only employees' preferences, attitudes toward the organization and overall satisfaction, but also how they define success on the job.

Review your workforce practices. Inventory and evaluate the effectiveness of current employee management processes. How do they facilitate (or sometimes hinder) the flow of talent? Examine practices throughout the "employee life cycle" – identifying and attracting, hiring and incorporating, training and developing, rewarding performance, engaging and retaining, and sustaining relationships (even after employees have departed). Look to best-practice organizations for useful practices that you have not yet deployed.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HOW TO BEAT THE COMING SHORTAGE OF SKILLS AND TALENT
KEN DYCHTWALD
TAMARA J. ERICKSON
ROBERT MORISON
HARVARD BUSINESS SCHOOL PRESS

Envision your future workforce. On the basis of business strategies, objectives and projections, as well as understanding of local labor markets, describe the workforce you'll need in three to five years. Break it down by capability, function, profession and location. What would be the ideal demographic mix? How do you want the labor markets to view you as an employer? Insofar as possible, translate this vision into tangible and measurable goals.

Move forward by identifying gaps, prioritizing needs and implementing solutions. As with any serious initiative, establish accountability, commit resources, and measure progress.

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LARRY LADIG

Don't just accept an offer, says **DAVID CHRISTIANSEN**. Make sure you know what you're getting yourself into first.

IT MENTOR

Acing the Interview

There's a lot more to a successful job interview than getting an offer. By David Christiansen

You're sitting across the table from John Q. Smith, manager in a big corporate IT department. He and his cohorts have just spent two hours grilling you about Web services, architecture, project management or whatever it is you're so darn good at. Smith is smiling reassuringly at you; you're the best candidate he's seen so far, and he's ready to stop looking.

"That pretty much wraps up the things I wanted to talk to you about," he says, sitting back in one of the elegant chairs that litter the office. "Is there anything you'd like to ask me?"

You smile casually. "I can't think of anything," you reply.

"Good," Smith says, getting to his feet.

Two minutes later, you're back on the street. You wait until you're sure no one in the office building can see you before you pump your fist in the air, kick your heels or do whatever your patented "I just nailed that interview" move happens to be.

Sounds great, doesn't it?

Unfortunately, too many job changes aren't actually changes for the better. Instead, we eventually find that we have simply exchanged one set of problems for another. There's a saying about choosing between the dragon you know and the one you don't know. Unfortunately, when it comes to job changes, the dragon you don't know often won't bare its teeth until it has you in its clutches. And then it's too late.

So, what can you do to make sure you see the unknown dragon for what it really is before you commit? You only get one shot at evaluating an organization, and that's the job interview.

Remember when Smith offered to answer your questions after he'd finished? That's the point when you should change your focus and ask pointed questions designed to help you determine whether the company fits your ambitions and desires. Think about the things that have frustrated you in the past. Do you hate red tape? Poor decision-making? A demoralized workforce? Then, try to think of specific questions that could indirectly expose those aspects of the company.

Here are some sample questions that I've come up with, based on my own past struggles:

How long does it take from the time someone identifies a need for a new piece of hardware to the time it is connected to the network and is available? Tell me about the people and processes involved.

Even if buying a server doesn't have anything to do with the job you're considering, it's important to know how complicated the approval and decision-making process is. This is frequently one of a company's most process-laden activities, so it's good to know how painful it is.

If it takes four months to get a server, you can bet there's a mountain of process, people and organizations between you and the things your projects will need to succeed.

If the interviewer's answer amounts to "How long would it take you to go down to Fry's Electronics and buy it?" then you may be facing an employer with a very ad hoc decision-making process. Either way, it's better to know than to not know.

What's the most frustrating thing you've had to do this week?

This is a good question to ask tech leads and developers if you've established a good rapport with them. I'd save this question for them. It's not likely to reveal much about managers because of its vagueness.

What do you and your co-workers do at work for fun?

This is a tricky one. If the answer is all about formal, organized activities on a regular basis, there is a significant possibility of a big morale problem. Ad hoc celebrations or activities (like a pickup game of Nerf basketball in an empty cube) indicate a more relaxed, easygoing atmosphere that's focused more on performance than on formality.

In the middle of a project, a developer identifies a key technical improvement that will have significant benefit but also involves additional cost and risk. What's the process for deciding whether to make the change? Who's involved, and who makes the final decision?

The answer will help you figure out how risk-averse the organization is. It can also provide insight into the quality of the relationship between this IT group and its business partners.

Tell me about a time when you had to correct the behavior of a direct report.

Ask this one of your prospective manager, and pay careful attention to his response. If he is vague or won't give you a specific answer, beware. A manager who declines to answer this could be abusive, indecisive or simply incapable of resolving difficult issues.

Tell me about the different positions you've had in the company and the different organizations you've worked for. How long did you work in each? Did you ask for this position, or were you sent here as a result of an organizational change? Was the position change the result of a promotion?

This can tell you a lot about the frequency and nature of change in the organization, as well as the ease with which people move around.

Take notes on the answers. Then, as soon as the interview is over, go back over your notes and add any other thoughts that come to you. The key is to try to capture the tone of their answers in a way that will be meaningful to you later. Keep reviewing your notes as the hiring process continues, and watch how your impression of the company changes over time. If you have multiple interviews, use your notes to plan more questions for the next meeting. Try to think of questions that could help confirm any suspicions that may have formed based on previous interviews.

Finally, don't accept an offer without reading through your notes one last time. This will help you put the whole offer into perspective. Then, trust your intuition and make the best decision you can. Good luck. ▸

Crib Sheet

IF YOU DON'T want to forget any important questions, but you're afraid that having a list looks nerdy, write them all on the third page of a simple notepad and take it to the interview. During the course of the interview, take notes on the first two pages. Write down the name and title of everyone you meet, and note anything they say that you think is important.

When it's your turn to ask questions, flip to the third page. The interviewer is likely to think you're simply referring to your notes, particularly if you rephrase the questions rather than reading them straight from the page.

– DAVID CHRISTIANSEN

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PAUL GLEN

The Technical Siren's Call Isn't Easy to Ignore

I RECENTLY had the privilege of giving a speech at my alma mater, Cornell University, and wandering the campus brought back memories.

Other than a building boom, the nearly 20 years had brought few changes to the campus. It was still clean and beautiful, and the only thing missing was the group of Hacky Sack players on the quad, who had been replaced by the decidedly more violent Society for Creative Anachronism kids, wearing armor and shields and whacking each other (rather hard) with wooden swords.

PAUL GLEN is the director of the Developing Technical Leaders Program (*www.developingtechnicalleaders.com*) and author of the award-winning book *Leading Geeks: How to Manage and Lead People Who Deliver Technology* (Jossey-Bass, 2002). Contact him at **info@paulglen.com**.

I'm now at an age when I'm supposed to get nostalgic for my college days, and I was. What if I could go back and be a student again? The learning (and drinking, I suppose) called to me, and it got me thinking about a lot of managers I know.

At one time or another, most technical managers long to do technical work. For most of us, hands-on production dominated our early careers, and just as a yearning for youth reached out to me, technical work sends out a siren's call to managers.

But, as opposed to my consequence-free indulgent fantasy, heeding the call of technical work endangers the careers of managers and the health of their projects.

Why is this desire so common? I've got a few theories:

A yearning to relive your glory days. Management generally doesn't offer the same thrill of many early career successes. It's hard to get the sense of accomplishment that comes with making some bit of technology jump through particularly challenging hoops.

A longing for simpler times and work. Managerial work is often subtle and ambiguous. It's hard to know if things are going well or not. Politics can be messy, and emotions baffling. Technology, while complex, offers a much clearer landscape.

A desire for immediate results. Management successes typically take months or even years to realize. Technology offers quick feedback. There's nothing like seeing that new window pop up for the first time and do exactly what you want it to do.

So, what's the big deal if a manager indulges in a little geeking out? There are a number of dysfunctional behaviors that I associate with this:

Micromanagement. The urge to stay hands-on often results in managers trying to micromanage their technical staffs. This is a bad idea, in part because it's impossible to be up to date on all the minutiae of everyone's work. But, more important, micromanagement conveys a lack of trust of the technical professionals a manager is supposed to be overseeing and nurturing.

Unqualified decision-making. In most cases, managers who engage in technical work are not really as knowledgeable as they think they are. They may have been in the past, but current competency is often an illusion. Wresting technical decision-making away from technical staff often works out badly.

Wasted time. Technical work takes lots of time and concentration. It's easy for managers to lose enormous amounts of time doing things that could be better and more productively done by others.

Abandoned responsibilities. Perhaps worst of all, managers frequently neglect the responsibilities of leadership when they pick up technical work. When they revisit their old comfort zones, no one is fulfilling important management functions.

Since getting their hands back on technology is such a natural wish, how should managers deal with these longings? It seems pointless to suggest that they should just "get over it." Relying solely on willpower is rarely a feasible option. So I'll suggest a couple of other strategies:

Forgive yourself for having these feelings. It's perfectly normal and healthy to reflect on the past and long for the good times. Some days, it's all the joy we're going to get. Management can be a tough job, and one that gets you dang little sympathy. Realize that this does not mean that you shouldn't have gone into managerial work.

Allow yourself a small indulgence. Whether at work or at home, give yourself permission to do one small technical thing. If your team is working on a project, get someone to assign you a little task, preferably one that's off the critical path. Then be a team player and enjoy a small — and I repeat *small* — amount of tech time. Or, if that's not feasible or politically wise, go home and set up a server. Buy yourself a few toys and go into the geek cave for a while. It's much better to play around a little in a contained space than to invade other people's work.

So when you hear the siren's song, lash yourself to a keyboard and hold on tight. You can get through it without leading all your people onto the rocks. ▸

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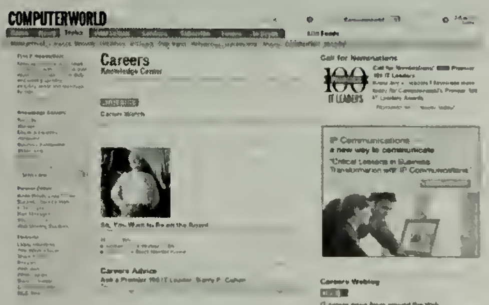

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VA

efficiencies. The shift to a so-called federated IT structure is now seen as a vital step toward improving security.

Nicholson also said he had issued a memo last week that gives the agency's CIO a "stronger, clearer delegation of both responsibility and authority" for enforcing security policies and directives. In addition, Nicholson said he has created a chief financial officer position with budget authority in the VA's central IT office.

"One of the redemptive aspects [of the laptop theft] is the absolute wake-up call to make changes — some of which will become models for other agencies that have similar complacency and laxity in information security," he said.

Rep. Bob Filner (D-Calif.), a member of the Veterans' Affairs Committee, said the planned IT overhaul at the VA needs to stay on course, as do ongoing investigations of how the culture inside the agency made it possible for the massive data breach to occur.

GETTY IMAGES

NICHOLSON said Thursday that he hopes some of the steps being taken by the VA will be adopted by other agencies with similar "laxity" on security.

Robert McFarland, who was the VA's CIO from February 2004 until he resigned this past April, made a similar point at a separate hearing last Wednesday that the committee held on the VA's IT structure. "I believe that if you don't consolidate the infrastructure under the CIO, you can't ensure that the environment is safe," McFarland said.

Prior to quitting, McFarland had been trying to implement the new federated IT structure, which is designed to centralize budgeting as well as the management of IT operations and maintenance. Previously, virtually all IT spending was controlled by the agency's three main operating divisions. McFarland said at the hearing that the change to centralized budgeting provided better oversight of IT spending and that the VA had started to move toward a consolidation of its IT infrastructure.

But he noted that the VA's "history of decentralized management" has made the agency resistant to change. "A vast majority of the issues at the VA were not about technology but about culture," McFarland said. "The problem was disagreement over the change."

Cultural Barriers

John Gauss, who was CIO at the VA between 2001 and 2003, said at the Wednesday hearing that implementing a strong information security program had been his top priority at the agency. Gauss added that he thought all IT projects and technology activities should be managed by the central IT office. But, like McFarland, he said that "cultural impediments" precluded progress from being made. "There was commitment at the executive level to have reform," Gauss said. "But the attitude was to fix it within the current processes."

Nicholson and Robert Howard, the VA's acting CIO, said things have now changed. "There's no question that this can be fixed," Howard said on Wednesday. "We're heading in the right direction." He reiterated that point at Thursday's hearing, saying that Nicholson has given him the authority to "do what I need to do, and that is what I intend to do."

The reorganization plan would initially create two IT "domains" at the VA: one that is responsible for operations and maintenance and is directly under the control of the agency's CIO, and another that handles application development and is managed by the VA's health care, benefits and cemetery divisions. But the overhaul isn't expected to be completed until July 2008, according to Nicholson.

Howard said at the Wednesday hearing that the plan also calls for eventually combining application development activities with operations and maintenance. That would completely centralize the VA's IT organization and is "a very important aspect" of ensuring that data is secured, he said.

However, Howard added that he has argued against a full centralization of IT at this point. "We can do it right away, but my opinion is that we shouldn't," he said. "We're deep into consolidating operations and maintenance."

In addition to the organizational changes, Nicholson said he is looking at ways to "put some teeth" into the VA's efforts to improve security. That could include withholding bonuses to key IT staffers if the agency continues to score poorly on the annual report card measuring its compliance with the Federal Information Security Management Act.

However, the VA's security efforts were dealt a blow last week when Pedro Cadenas submitted his resignation as its chief information security officer on Thursday morning — just before Nicholson testified at the hearing. ◗

> "A vast majority of the issues at the VA were not about technology but about culture. The problem was disagreement over the change.
>
> **ROBERT MCFARLAND,** CIO AT THE U.S. DEPARTMENT OF VETERANS AFFAIRS UNTIL APRIL

> "There's no question that this can be fixed. We're heading in the right direction.
>
> **ROBERT HOWARD,** THE VA'S ACTING CIO

Laptop Recovery Clouded by Other Breaches

VA SECRETARY R. James Nicholson last Thursday said a preliminary forensic analysis of the stolen laptop and disk recovered by the FBI showed no evidence that the data on them had been accessed or tampered with. "There's reason to be optimistic," Nicholson told the House Committee on Veterans' Affairs, although he added that a full investigation of the items had yet to be completed.

Relief over the recovery of the stolen equipment was tempered by the acknowledgement that additional data breaches had taken place at the VA and by a disclosure that its attempt to strengthen laptop security has been temporarily put on hold because of a class-action lawsuit.

Under questioning by Rep. Steve Buyer (R-Ind.), the committee's chairman, Nicholson said a backup tape containing legal and other case-related information on 16,538 veterans was discovered to be missing from a locked room at a VA facility in Indianapolis on May 5. Nicholson added that he learned about the missing tape about three weeks later. He said the veterans affected by the breach are being notified about the potential theft of their personal information.

The other incident took place last year in Minnesota, Nicholson said. Papers containing the names, addresses and Social Security numbers of 66 veterans were lost when a VA auditor put the papers in the trunk of a rental car that was later stolen. The incident was brought to the attention of VA officials by a postal inspector who suspected that the identities of two patients in an extended care facility had been stolen, Nicholson said.

As part of the corrective actions being taken by the VA in the wake of the laptop theft, Nicholson has ordered that all agency-owned laptops be turned in for a review to ensure that security tools are installed and up to date.

But Tim McLain, the VA's general counsel, said that the lawyers in one of three class-action lawsuits filed against the agency over the stolen laptop had objected to the VA's plans to update laptop security protections as needed.

"There was a strong letter saying that this would be destroying evidence or tampering with evidence," McLain said. So until a judge rules on the issue, the VA's plans are on hold. "It is a delay, not a moratorium," he said.

– JAIKUMAR VIJAYAN

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FRANK HAYES ■ FRANKLY SPEAKING

A Good Start

IT'S A START. On June 23, the Office of Management and Budget announced that federal agencies have 45 days to put new data-protection measures in place (see story, page 6). The new requirements (technically, they're "recommendations," but the OMB appears serious about this anyway) include encryption for all sensitive data on mobile devices, logging of all extracts from databases containing sensitive information and verification that the downloaded sensitive data is deleted after 90 days.

The good news: This can be done now using off-the-shelf products.

The bad news: It probably won't be successful — not unless the IT people putting it in place remember that you can't just secure the data. You have to secure the people, too.

And we already know, from incident after horrendous incident, that the employees of federal agencies aren't secure. Not at the Internal Revenue Service (laptop stolen with personal data on 291 employees and job applicants). Not at the Federal Trade Commission (two laptops stolen containing financial data related to investigations). Not at the Department of Veterans Affairs (laptop stolen with personal data on 26.5 million vets).

And that's just laptop thefts in the past six weeks.

But who's surprised? Government users are a lot like our users. Some are sharp, security-conscious and safe. Others are . . . well, not so bright. Still others are lazy or just can't be bothered when it comes to security, or are even actively hostile to anything that limits their flexibility.

The result: Any security scheme that depends on users is doomed. No matter how good the technology is. No matter how big the stakes are. No matter how tough the rules are. Users just can't be trusted to act securely.

Security will work only if we make things really, really easy to do in a secure way — *and* make things really, really hard to do in insecure ways.

This isn't just a technology problem, or even a technology implementation problem. It's a social engineering problem.

So in the case of the new OMB guidelines, it won't be nearly enough to add an encryption capability to laptops. Too may users won't use it. What's needed is a self-encrypting file system that transparently encrypts everything by default, without requiring users to do anything special.

And federal IT people will probably want to put that on *all* PCs, not just laptops. That way, all files will be encrypted, all the time. And when a laptop is lost or a file is copied onto a thumb drive, the data will still be safe.

Logging sensitive data downloads should be simple and transparent enough for users; IT just needs to log everything pulled from databases. But enforcing that "delete it after 90 days" rule sounds like it could require a lot of human intervention, doesn't it? Or not — if it's implemented using the sort of digital rights management (DRM) technology that everyone grumbles about when it's applied to music and DVDs.

Actually, the new rule is that downloaded sensitive data must be deleted after 90 days *or* the user must confirm that it's still needed. That's a perfect job for DRM, where the ability to extend access permission is usually standard equipment.

But what if users forget to ask for an extension after 90 days when they still need the data? The DRM system will lock the file. Users will call the help desk. And that help desk will need to be very forgiving.

Sure, they've broken a rule. And sure, access-permission extensions will become as common as password resets. They'll cost the help desk effort and aggravation. But this is the social engineering you need to keep users on the secure path.

Remember: Easy to be secure, hard to be insecure. If federal IT people can meet that requirement while they implement the OMB's "recommendations," they'll have made more than a start on better data security.

They'll have created a security success — and a good example for the rest of us. ▸

FRANK HAYES, *Computerworld's* senior news columnist, has covered IT for more than 20 years. Contact him at **frank_hayes@computerworld.com.**

There's Always a Reason

After several smash-and-grab robberies, this company installs a very high-tech alarm, complete with sensors to detect office windows breaking. But the new system seems to malfunction from the start, frequently sending false alarms to local police. Finally, one lonely weekend, this pilot fish is doing a system upgrade and hears glass smashing. "While dialing 911 on my cell phone, I ran toward the sound," says fish. "But there was no damage anywhere – just the gentle purring of a PC left on. Turns out our sophisticated alarm system actually did work. This PC had a unique notification sound for incoming e-mail: breaking glass."

SHARK TANK

Impossible

This IT pilot fish is consolidating two branch locations into one, and on the day of the big move, he gets a call on his cell phone. It's a sales guy from one of the branches, asking fish for permission to retrieve a file from the server. "No, that's not possible," says fish. Why not? "Because the server is disconnected." Well, can you reconnect it just for me? "No, that's not possible." Why not? "Because the server is in the back seat of the rental car that I am currently driving to the new location."

No, That's Not It

User's PC makes an annoying noise, and this pilot fish tracks it down: The fan on the video card is about to die. "I informed the user that it would be quicker to replace the video card than the fan," says fish. "He asked if the card could be removed or disabled, since the noise was so distracting. After I explained that it was an important part of his PC and couldn't be removed or disabled, he responded that he assumed that it was only for watching videos, and he didn't do that on this computer."

Anything Else?

Pilot fish gets a message via voice mail from a user he helped the previous day with a problem that had nothing to do with e-mail: "Listen, I don't know what you did yesterday, but today I can't get to any of my e-mails. I'm not sure what you did, but could you come and . . . Oh, never mind. I found my mail. Sorry about that."

Wanna Bet?

Networking pilot fish needs to restart the primary domain controller, so he notifies users and then sends an all-clear message when the work is done. "I send out the all-clear e-mail and ask any users still having difficulty to contact the help desk," fish says. "I then receive an e-mail response: 'Yes, I'm still having trouble. I can't respond to e-mails.' "

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